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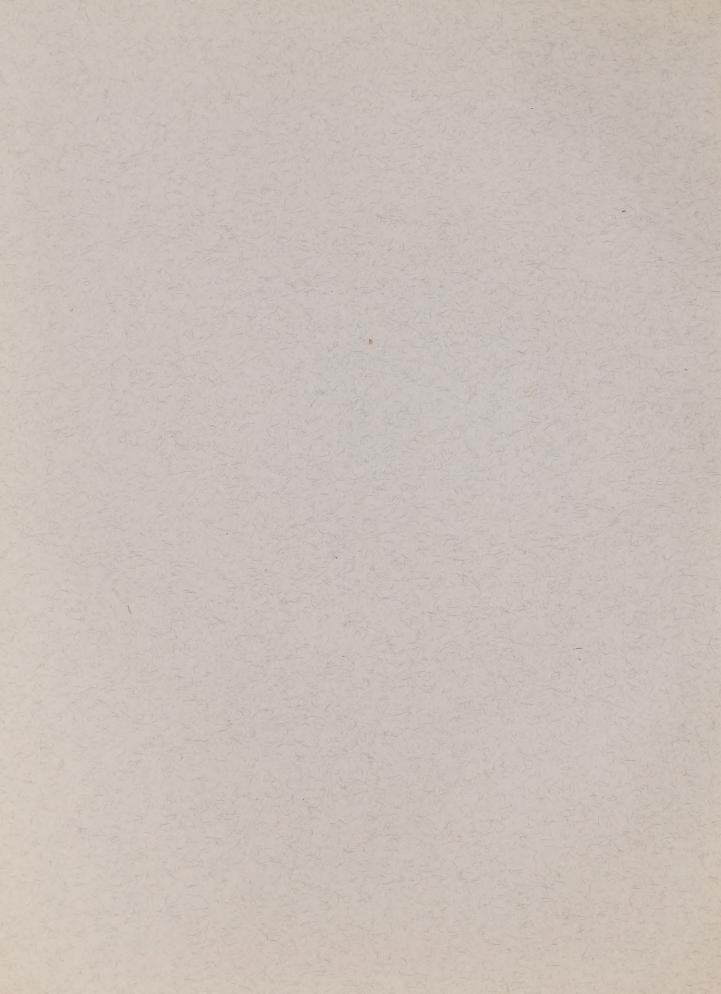
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SUMMARY OF OCEANOGRAPHIC RECORDS
OBTAINED FROM MOORED INSTRUMENTS
IN THE STRAIT OF GEORGIA — 1969-1970
Current Velocity and Seawater Temperature
from Station H-06

S. Tabata, J.A. Stickland



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270 177 17

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INTRODUCTION

The waters of the Strait of Georgia have been the subject of many oceanographic studies for more than half a century. The earlier studies of the region consisted mainly of physical, chemical and biological oceanographic descriptions of the waters and some of the main factors affecting the properties of the waters therein. The studies vary, in scope, from a brief initial description of the waters by Fraser and Cameron (1916) and a more detailed work by Hutchinson and Lucas (1931) and to a more complete treatment by Waldichuk (1957), to name a few.

In spite of the number of oceanographic studies made on these waters there was a notable lack of reliable information of the surface and subsurface circulation in the Strait. In order to relieve this deficiency, the Pacific Oceanographic Group embarked on a limited program of current velocity observations in the central portion of the Strait of Georgia. The initial observations consisted only of surface drift measurements, the results of which have already been reported (Giovando and Tabata, 1970) and a series of velocity profile measurements from anchored vessels, the results of which have also been reported (Tabata, Stickland, Wong and Giovando, 1970 (a); 1970(b); 1970(c)).

In recent years the marine technology associated with automated oceanographic observations from moored instruments has advanced to the stage where it is now possible to obtain reliable data from unattended instruments for periods exceeding one month. The present series of observations to be reported here are based on data obtained from such instruments.

The primary objective of the present program of observations is to obtain current velocity records at sufficiently high frequency and of sufficient length so that it would be possible to examine the spectrum of the variability of current velocities in the frequency band between 1 cycle and 10^{-3} cycle per hour (period of few hours to few months approximately), at a representative area of the central Strait. Such data would provide, in addition to basic scientific information, solid background material that would be useful in a variety of applied oceanographic studies such as those associated with pollution and fisheries. As most of the instruments employed recorded temperatures of the water as well as current velocities, they too are reported.

A report describing the observational program, performances of current meters used, mooring technique, computer data-processing method, etc. has already been published in the Technical Report Series of the Fisheries Research Board of Canada (Tabata, Stickland and de Lange Boom, 1971).

The present report comprises the summary of oceanographic measurements obtained from Station H-06 (Fig. 1 and 2). It is the second of the series of reports associated with the program of oceanographic observations from moored instruments in the Strait of Georgia to be issued.

The summary contains:

- 1) histogram of current speed
- 2) histogram of current direction

- 3) histogram of current direction in polar form
 4) histogram of temperature (if applicable)
 5) progressive vector diagram of current velocities

Local standard time, Pacific Standard Time (P.S.T.), is used throughout (time zone + 8).

BACKGROUND INFORMATION

The only current measurements made in the open waters of the Strait, prior to 1953, were by means of drift bottles. They were carried out under the direction of Dr. W.A. Clemens. The data so obtained have been used later to interpret the surface circulation in the Strait of Georgia, (Waldichuk, 1957; Waldichuk, 1958).

In 1953, for the first time in the Strait, current observations were made at 8 fixed locations in the Strait from an anchored ship (Waldichuk, 1957). They were generally taken at hourly intervals at selected depths for a period of one tidal day (25 hours) at each station. While surface currents were observed by means of a customary captive drift pole, subsurface currents were measured with an Ekman Current Meter.

A year later, a series of 6 stations was occupied between Tsawwassen and Galiano Island (Fig. 1) and surface and bottom currents were measured for one tidal day at each of the stations (Pickard, 1956). The surface currents were observed at half-hourly intervals utilizing a drift pole while the bottom currents were measured with an Ekman Current Meter at hourly intervals.

During the summer of 1963 a series of 3 stations in a line between Nanaimo and Sechelt (Fig. 1) was occupied by the Canadian Hydrographic Service and currents were measured at depths of 5, 100 and 300 metres (m) with self-recording BBT (Neyrpic) current metres (analogue output) at each of these stations at 20-minute intervals for period up to 30 days (Huggett, 1966). The method used to obtain the data represents a significant improvement over previous methods. However, even when currents were measured in this manner, the results indicated inconsistency in the day-to-day flow patterns although the 15-day averages did indicated the presence of clockwise rotary tidal currents.

LOCATION OF STATIONS

A line of 3 stations, H-06, H-16 and H-26, placed 10 kilometres (km) apart, was established between Valdes Island to the west and Point Grey to the east in April 1969 (Fig. 1). They remained stationed until the completion of the survey in September 1970. As is evident from Fig. 2, the western half of the line is deeper than the eastern side, the maximum depth being located a few kilometres east of Station H-06. The small ridge shown to the east of Station H-16 is part of a shoal having a minimum depth of 146m and situated within a few kilometres to the southeast of the ridge shown in the Figure.

The positions* and the depths of the 3 stations are:

H-06

Latitude 49°06.23'N

Longitude 123° 33.70'W

Depth 252m

H-16

Latitude 49° 09.07'N

Longitude 123° 26.75'W

Depth 295m

H-26

Latitude 49° 11.93'N

Longitude 123° 19.80'W

Depth 162m

* The exact locations of these stations are generally within one-half mile of those indicated above.

COMMENTS

Station H-06

Subsurface-Buoy Mooring

April 16 through April 22, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 100)

6-day period. No comment.

200m Aanderaa Current Meter (Serial No. 99)

6-day period. No comment.

Note: Surface buoy damaged by unspecified ship within 24 hours after mooring established. Subsurface buoy and current meters at depths of 50m and 200m unaffected. Current meters retrieved on April 22, but during recovery incurred damages to meters.

July 10 through August 28, 1969.

49-day period. No comment.

200m Aanderaa Current Meter (Serial No. 99)

49-day period. No comment.

August 28 through September 18, 1969.

21-day period. No comment.

200m Aanderaa Current Meter (Serial No. 99)

21-day period. No comment.

September 18 through October 16, 1969.

28-day period. No comment.

200m Aanderaa Current Meter (Serial No. 99)

28-day period. When current meter retrieved and inspected, found screw holding encoder loose.

October 16 through November 25, 1969.

40-day period. No comment.

200m Aanderaa Current Meter (Serial No. 99)

40-day period. No comment.

Note: Bathythermograph observation and hydrographic cast made at 1300 and 1310 respectively on November 25, 1969.

COMMENTS (cont'd)

November 25, 1969 through January 14, 1970.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 100)

50-day period. No comment.

200m Aanderaa Current Meter (Serial No. 99)

50-day period. No comment.

January 14 through February 19, 1970.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 100)

36-day period. No comment.

200m Aanderaa Current Meter (Serial No. 99)

36-day period. No comment.

Note: Bathythermograph observation and hydrographic cast made at 1305 on January 14, 1970.

February 19 through March 25, 1970.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 100)

34-day period. No comment.

200m Aanderaa Current Meter (Serial No. 99)

34-day period. No comment.

March 25 through April 27, 1970.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 100)

Current meter leaked. Data available for only

4 hours - not included in this data report.

200m Aanderaa Current Meter (Serial No. 99)

31-day period. Last two days of records "dirty" due to dragging when grapple hooked main line. Last reliable data April 25, 1970. Thermometer

well and fin corroded.

Taut-rope Mooring

April 27 through June 8, 1970.

Instrument Depth: 3m Aanderaa Current Meter (Serial No. 210)

42-day period. This meter lifted off water sur-

face for 1 minute at 1115 on April 28, 1970 for

inspection.

50m Aanderaa Current Meter (Serial No. 211)

42-day period. No comment.

200m Aanderaa Current Meter (Serial No. 99)

42-day period. No comment.

COMMENTS (cont'd)

June 10 through July 27, 1969.

Instrument Depth: 3m Geodyne*Current Meter (Serial No. M-228)

Current meter did not produce any data.

50m Aanderaa Current Meter (Serial No. 211)

47-day period. No comment.

200m Aanderaa Current Meter (Serial No. 210)

47-day period. No comment.

Note: 2 days gap between the beginning of this series of data and end of previous series.

July 27 through September 24, 1970.

59-day period. No comment.

50m Aanderaa Current Meter (Serial No. 102)

59-day period. No comment.

^{*} It is to be noted that while the Aanderaa (Bergen) Current Meter used in the present program was made to sample every 10 minutes, the Geodyne Current Meter was set to "burst-sample" every 15 minutes (that is, every 15 minutes it recorded 15 samples at 5-second intervals).

ACKNOWLEDGEMENT

The acquisition of, and the processing of oceanographic data obtained from moored instruments require the assistance and cooperation of many individuals and groups. We acknowledge the assistance rendered by the staff of the Nanaimo Biological Station of the Fisheries Research Board of Canada, of the Pacific Oceanographic Group of the Marine Sciences Branch (now at the Pacific Environment Institute at West Vancouver, B.C.), of the Tidal and Current Survey of the Marine Sciences Branch and the officers and men of the research vessels, C.G.S. Parizeau (M.S.B.), C.G.S. Vector (M.S.B.) and C.G.S. A.P. Knight (F.R.B.C.). Individuals associated with the above were duly acknowledged in our first report. Since the publication of the first report in 1971, a number of people have assisted in the computerprocessing of data and in the preparation of illustrations. We appreciate the generous assistance given by Mr. J.A.C. Thomson and Mrs. A. Sandnes of the Computing Centre at the Nanaimo Biological Station, Messrs. B. de Lange Boom and I. Daniel who processed the data, Miss T.A. Findlay who prepared the illustrations, and Mr. C. Morley of the Nanaimo Biological Station and Mr. R. Banyard of the Canadian Hydrographic Service of the Marine Sciences Branch who photo-reproduced all the illustrations. We owe our thanks to Miss M. Dyer for organizing and making the preparatory work essential to the publication of this report.

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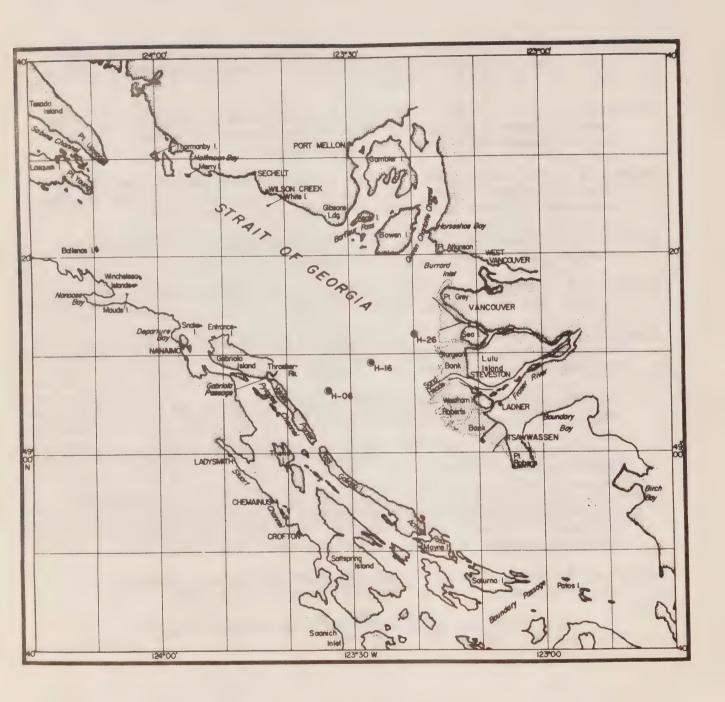
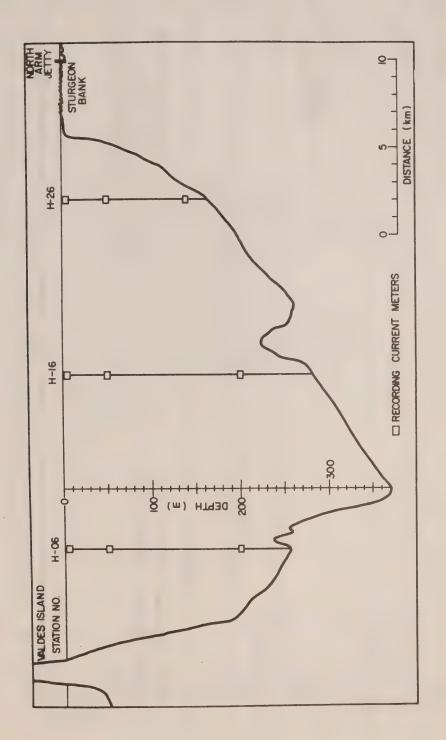
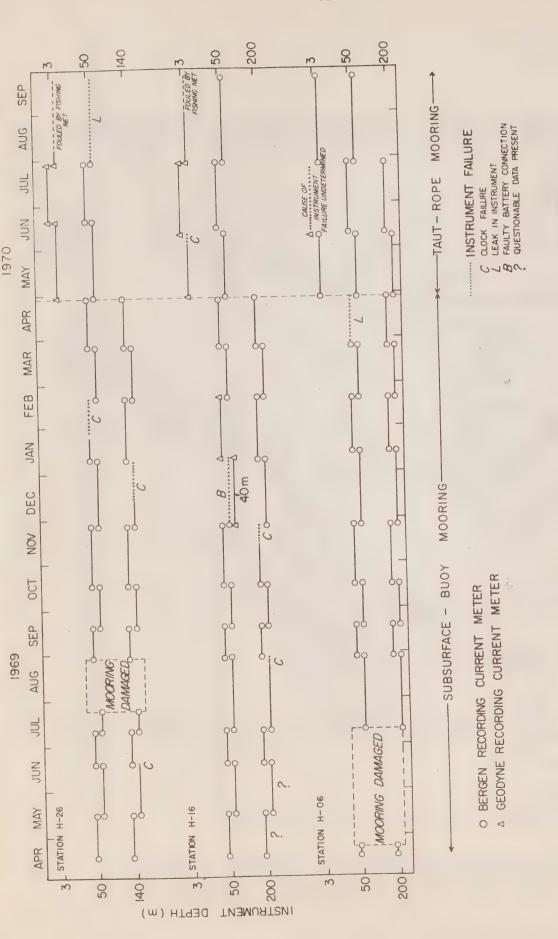


Fig. 1. Location of stations in the central Strait of Georgia where observations were made. The records described in this report were obtained at Station H-06.



Cross-section along the line of stations H-O6, H-16 and H-26, between Valdes Island and Point Grey. The records described in this report were obtained at Station H-06.



Schematic drawing showing summary of events that occurred during the program of observations during 1969-1970. The records described in this report were obtained at Station H-06.

3

Fig.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 3 METRES DESERVATION PERIOD, FROM 14. 5/27/ 4/70 TO 14. 0/ 8/ 6/70

MEAN SPEED	FREQU NO.	PCT.		100 I	150 [200 I	250 I	300 I	350 I	400 I	450 I	50
C	0	U	0				-	•	-	•		
20	6	0	0*									
40	0	0	0									
60	1	0	0									
80	2	C	0									
100	0	O	Û									
120	1	U	0									
140	7	0	0*									
160	28	0	044444									
180	35	1	0*****									
200	61	1	0									
270	56 93	1	()********									
24C 260	146	2	0									
280	151	2	0*****									
300	209	3	0******									
320	215	4	(********			********						
340	241	4	0 * * * * * * * * * * * * * * * * * * *				***					
360	276	5	0 * * * * * * * * * * * * * * * * * * *			*********	*******	*				
380	255	4	0**********			*********	*****					
400	273	5)***********									
420	217	4)*********									
440	214	4	0*********	********		*******						
460	202	3	0 * * * * * * * * * * * * * *	********	******							
490	185	3	***********	********	******							
510	184	3	0*********		*******							
520	1 7 7	3	^***********									
540	253	4	0*********									
560	225	4	0*****		******	*********	•					
580	260	4	0********		*******	********	*****					
600	252	4	0 *** * * * * * * * * * * * * * * * * *									
620	254	4	0*******				*****					
640	247	4)********				****					
660	224	4	0**********				•					
690 700	208 116	3)***********		******							
720	133	2	0******									
740	97	2)********									
760	90	1	0*********									
780	77	1	0*********									
300	61	ī	0 * * * * * * * * * * *									
820	40	î	0*****									
840	40	1	0 * * * * * * *									
860	27	0	0****									
088	35	1	0 * * * * * *									
900	35	1	0*****									
920	15	1)	0 * * *									
940	15	С	0***									
960	24	O	0****									
980	11	0	0 * *									
1000	10	0	0**									
1020	14	Ú	()***									
1040 1060	7 11	0	O##									
1080	3	0	0*									
1100	1)	0									
1120	1	())									
1140	1	O.	2									
1160	0	9	0									
1180	1)	0									
		- /										

FIG. 4A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 42-DAY PERIOD DURING APRIL 27 THROUGH JUNE 8, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 3 METRES OBSERVATION PERIOD, FROM 14. 5/27/ 4/70 TO 14. 0/ 8/ 6/70

```
50
I
                                  100
                                                                                                    400
      FREQUENCY O
                                                                              300
                                                                                         350
                                                                                                              450
                                                                                                                         500
      NO.
           PCT. I
       245
              4 0------
       171
       190
30
35
       141
40
       105
45
       104
        58
                 0 . . . . . . . . . . . .
80
85
90
        41
100
105
110
115
                 0 * * * * * * * * * *
120
        71
                 125
130
135
140
150
                 155
160
        78
165
170
        72
        72
175
       104
180
        84
190
195
200
        63
205
        58
210
        56
215
        52
220
225
        51
230
240
                 0 * * * * * * *
245
                 0 ********
250
255
        32
260
        31
265
        56
270
280
285
290
295
300
        58
        70
305
310
        81
315
        87
325
       105
330
       123
335
       140
340
       137
345
       152
350
       146
355
       191
                 0 *********
```

NUMBER OF OBSERVATIONS = 6048

FIG. 4B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 42-DAY PERIOD DURING APRIL 27 THROUGH JUNE 8, 1970.

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W DIRECTION HISTOGRAM FOR CURRENTS AT 3 M. FROM 14. 5/27/ 4/70 TO 14. 0/ 8/ 6/70 N 450 400 350 -300 -250 \$00 150 RADIAL SCALE IS NO. TOTAL DESERVATIONS 6048 DEL DOSERVATIONS

FIG. 4c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 42-DAY PERIOD DURING APRIL 27 THROUGH JUNE 8, 1970.

STATION NO. H- 6 1 AT. 49- 6-22 N LONG. 123-33.74 W HISTOGRAM OF T MPERATURE (DEG. CENT.) AT A DEPTH OF 3 METERS TIS RVATION PERIOD, FROM 14. 5/277 4/70 FO 14. 07 8/ 6/70

```
9.00
7.1
8.90
9.00
7.1
7.20
7.40
7.40
7.70
4.60
7.70
4.50
7.90
          19.10
13.20
10.30
10.40
10.50
10.60
1..70
10.80
13.90
11.90
          0 0***
NUMBER OF TEMP. GREATER THAN 16.90 = 22
                          NUMBER OF OBSERVATIONS = 6048
                                                 MEAN TEMP = 11.42 DEG. C.
```

FIG. 4D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 42-DAY PERIOD DURING APRIL 27 THROUGH JUNE 8, 1970.

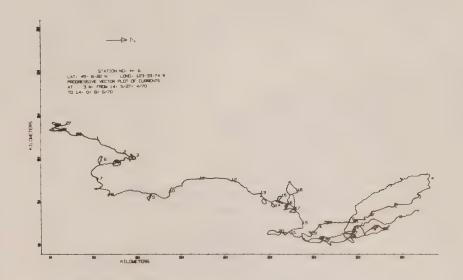


Fig. 4e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 42-day period during April 27 through June 8, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

```
.1ATIUN NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W
```

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 3 METRES IN SERVATION PERIOD, FROM 16-14/27/ 7/70 TO 14-28/24/ 9/70

```
400
          FREQUENCY O
                                50
                                           100
                                                       150
                                                                   200
                                                                               250
                                                                                           300
4LAN
               PCT. I
          NO .-
  80
 180
                     () # # #
                     () * * * * * * * * * * * *
  240
                      () *************
 260
280
          165
          236
  320
          223
          258
  340
           263
 400
          248
 420
          232
  440
          238
          2/6
 460
  480
  500
          341
  540
          297
  560
          241
  590
          285
 600
          329
  040
          394
          415
          390
  720
          371
  740
          349
  750
780
          269
          170
  900
                      0........................
          143
  820
          122
  840
           56
  860
                      ()********
  900
                      0 * * * * * *
                      0 *** * * *
  960
                     0 * * * * *
                      7 * * * *
                      0 **
 100
1020
1040
                  0
                      0 *
                      () #
 1060
                      0
 1080
 1100
            0
 1140
NUMBER OF SPEEDS GREATER THAN 1140 = 0
                                                           NUMBER OF OBSERVATIONS = 8485
                                                                                                           MEAN SPEED =
                                                                                                                             554 MM/SEC
```

FIG. 5a. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 59-DAY PERIOD DURING JULY 27 THROUGH SEPTEMBER 24, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM UF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 3 METRES OF SERVATION PERIOD, FROM 16.14/27/ 7/70 TO 14.28/24/ 9/70

MEAN	FREQU	UENCY	0	50	100	150	200	250	200	350	400		
JIR.	NO.	PCT.		I	1	1	1	2 J U	300 I	350 I	400 I	450	500
0	213	3						*			1	1	1
5	129	2	0 * * * * * *										
10	156	2)*****	*****		******							
15	151	2	·)******										
5.0	345	4	0 * * * * * *				*********	********	******				
25	296	3					********						
30	221	3					********	*					
35	194	2					*****						
40	198	2			*******								
45	172	2					* *						
50 55	161 133	2			• • • • • • • • • •								
50	135	2											
65	136	2			*****								
70	120	1	()******										
75	124	1	0 ******										
30	92	1	0 * * * * * *	*****									
35	108	1)*****	*****									
90	123	1	0*****		* * * * * * * * * * *	***							
95	. 93	1	3*****										
100	123	1			********	***							
105	108	1			* * * * * * * * *								
110 115	131	2			******	***							
120	102	1	0*****		*******								
125	129	2											
130	132	2											
135	147	2											
140	139	2											
145	180	2	0*****	*****	*******								
150	169	2											
155	194	2											
160	187	2				*********							
165	163	2				*********	•						
170	156	2											
175 180	123	1	0*****			**							
185	99	1	0*****										
190	98	1	0 * * * * * * *										
195	83	i	0*****										
200	82	1	0 *****										
205	71	1	0 ******	*****	*								
210	58	1	0 * * * * * *	* * * * *									
215	61	1	0*****	****									
220	51	1	0*****										
225	66	1	0 ******										
230	53	1	0******										
235 240	68 58	1	0 ******										
245	53	1	0*****										
250	57	i											
255	79	ī	^=====================================										
250	79	1	.)******	*****	* * *								
265	67	i)******										
270	81	1	O*****										
275	81	1]*****		* * *								
280	59	1	0 ******										
285 290	66 36	1	()******										
295	66	1	0 * * * * * *										
300	76	1	0******		* *								
305	92	1	0*****										
310	85	ī	0 ******				•						
315	71	1	0 ******										
320	76	1	0*****										
325	97	1	0 *****										
330	86	1)*****										
335	108	1											
340	111	1			*******								
345	105	1	0******										
350 355	117	1 2											
222	745	6	U										

FIG. 5B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 59-DAY PERIOD DURING JULY 27 THROUGH SEPTEMBER 24, 1970.

NUMBER OF OBSERVATIONS = 8485

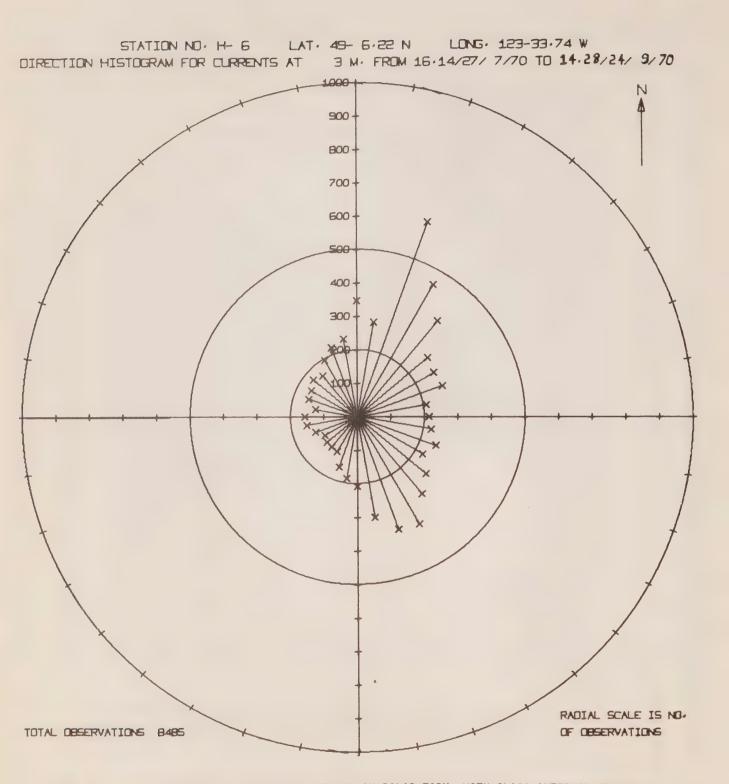


FIG. 5c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 59-DAY PERIOD DURING JULY 27 THROUGH SEPTEMBER 24, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 3 METERS OBSERVATION PERIOD, FROM 16.14/27/ 7/70 TO 14.28/24/ 9/70

```
PREQUENCY O
NO. PCT. 1
O O O
                                           100
                                                                                           300
                                                                                                      350
                                                                                                                  400
                                                                                                                                          500
TEMP .
11.00
11.10
11.30
11.50
11.60
11.80
11.90
12.90
                     0 . . . . . .
12.10
12.20
12.30
12.40
12.50
12.60
                     0 *******
                      () ****************
12.80
12.90
13.00
                      0*******
13.10
13.30
                       .......
          131
13.4.
13.50
14.67
14.67
13.90
14.70
14.20
14.30
14.50
          208
14.70
                      161
19.00
13.00
15.10
15.20
15.30
15.40
                      *****************
13.50
15.60
15.70
15.90
16.05
16.10
16.20
                      ) *********************************
          134
                      10.30
10.40
          138
16.70
          189
16.90
17.00
17.10
17.10
17.20
17.30
17.40
17.50
          336
          177
17.60
17.70
17.30
                      )************
17.90
le.00
                     )****
()*****
13.10
                      .....
                      9*****
                     0+++
13.40
18.60
18.80
18.70
19.20
NUMBER OF TEMP. GREATER THAN 19.20 = 0
                                                          JUMBER OF OBSERVATIONS = 8485
                                                                                                         MEAN TEMP = 15.46 DEG. C.
```

FIG. 5D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 59-DAY PERIOD DURING JULY 27 THROUGH SEPTEMBER 24, 1970.

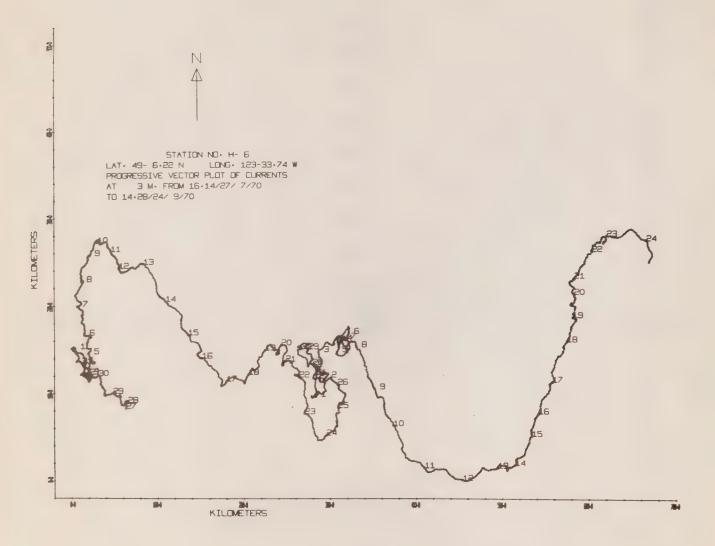


Fig. 5e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 59-day period during July 27 through September 24, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 13.55/16/ 4/69 TO 15.45/22/ 4/69

MEAN	FREQU	JENCY	0 10	20	30	40	50	60	70	80	90	100
SPEED	NO.	PCT.	I	I	I	I	1	I	I	I	1	1
0	0	0	0									
10	33	4	0******	**********	*********							
20	29	3	0	**********	*****							
30	13	1	0	***								
40	63	7	0 *** * * * * * * *	**********	**********	********		******				
50	42	5	0	**********	• • • • • • • • • • • • •	*******						
60	89	10	0*****	**********		********	*******	********		********		
70	48	5	()*******	**********	*********		***					
80	90	10	0 *********	**********	• • • • • • • • • • • • • • • • • • • •	********	******	********	•••••	*********	*****	
90	59	7	0*****	***********	*********	*********	********	****				
100	37	4	0******	***********	• • • • • • • • • • • •							
110	60	7	0 * * * * * * * * *	**********	********			*****				
120	41	5	0 * * * * * * * * * *			*****						
130	60	7	0 *** * * * * * * * * * * * * * * * * *				*******					
140 150	28 36	3	0 *** * * * * * * * * * * * * * * * * *									
160	13	4	0			•						
170	17	2	0									
180	19	2	~	******								
190	14	. 2	0******									
200	19	2		*******								
210	10	1	0 ********									
220	25	3	~									
230	7	í	0*****									
240	12	1	0 *** * * * * * * * * * * * * * * * * *									
250	5	1	0****									
260	2	ō	0**									
270	3	0	0+++									
280	1	0	0*									
290	1	0	0+									
3.0												
NUMBER	OF SPE	EDS GI	REATER THAN	290 = 0	NUME	BER OF OBSE	RVATIONS =	876	MEAN	SPEED =	102 MM/SE	С

FIG. 6A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 6-DAY PERIOD DURING APRIL 16 THROUGH APRIL 22, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 13.55/16/ 4/69 TO 15.45/22/ 4/69

44.57.4.4.1	EDEOUENC	v 0		20			5.0		7.0	0.0	0.0	100
MEAN DIR.	FREQUENC NO. PCT		10 .	20 I	06 I	40 I	50 I	60 I	70 I	80 I	90 I	100 I
0	39 4					*****	·	· ·		·	·	•
5	30 3		******									
10	26 3		******		***							
15 20	20 2 15 2											
25	8 1											
30	12 1											
35	7 1											
40	7 1											
45 50	13 1 7 1		*****									
55	12 1		****									
60	10 1		* * *									
65	9 1											
70 75	10 1		***									
80	3 0											
85	1 0											
90	6 1											
95	11 1											
100 105	5 1 3 0											
110	3 0											
115	7 1											
120	3 0											
125	8 1 7 1		4									
130 135	7 1 7 1											
140	12 1											
145	8 1	0*****	46									
150	18 2		******	***								
155 160	15 2 10 1		******									
165	27 3		*******	******	***							
170	21 2		******									
175	26 3				***							
180	21 2		*******	*****								
185 190	21 2 15 2		*******	*****								
195	9 1											
200	9 1											
205	13 1											
210 215	15 2 13 1											
220	7 1											
225	6 1											
230	7 1											
235	7 1											
240 245	4 0											
250	6 1											
255	4 0											
260		0 0 ***										
265 270	3 0											
275		0****										
280	4 0											
285		0*****										
290	2 0											
295 300		O*******										
305	12 1	0 *****										
310		2 0******										
315		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0										
320 325		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			**							
330		2 0*****										
335	17 2	2 0 *** * * *	******									
340		0 ******										
345 350		3										
355		4 0										

NUMBER OF OBSERVATIONS # 876

FIG. 6B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 6-DAY PERIOD DURING APRIL 16 THROUGH APRIL 22, 1969.

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W DIRECTION HISTOGRAM FOR CLRRENTS AT SO M. FROM 13.55/16/ 4/69 TO 15.45/22/ 4/69 90 -80 -70. 60 50 40 -RADIAL SCALE IS NO. TOTAL DESERVATIONS 876 OF DBSERVATIONS

FIG. 6c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 6-DAY PERIOD DURING APRIL 16 THROUGH APRIL 22, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS OBSERVATION PERIOD, FROM 13.55/16/ 4/69 TO 15.45/22/ 4/69

MEAN	FREQU	IENCY	0	50		100	150	200	250	300	350	400	450	500
TEMP.	NO.	PCT.	Ī	Ī		I	I	1	I	I	I	I	1	I
7.00	0	0	0											
7.05	0	0	0											
7.10	31	4	0 * * * * *											
7.15	151	1.7	0 * * * * *	****										
7.20	240	27	0 * * * * *	*****		*****	********		****					
7.25	170	19	7****	*****			*******							
7.30	123	14	() * * * * *	****		*****	+ W							
7.35	85	10	0 * * * * *											
7.40	59	7	() * * * * *	*****										
7.45	17	2	0 * * *											
ALLIMBED	OF TEMP	. Ga	EATED T	HAN 7	. 45 =	0	NUMBE	R OF MRSE	RVATIONS =	876	MEAN	TEMP =	7.24 DEG. C	

FIG. 6D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 6-DAY PERIOD DURING APRIL 16 THROUGH APRIL 22, 1969.

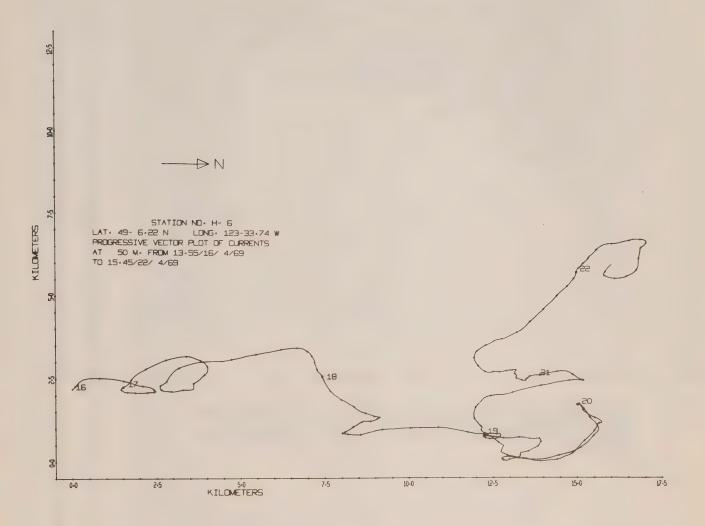


Fig. 6e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 6-day period during April 16 through April 22, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 9. 5/10/ 7/69 TO 16.15/28/ 8/69

```
MEAN
     FREQUENCY 0
                100
                      203
                             30 J
                                   400
                                         500
                                               600
                                                      700
                                                            800
                                                                  900
                                                                        1000
     NO. PCT. I
SPEED
     240
           162
 30
     185
     387
           0..........
           90
           453
         6
           0------
 100
 110
120
 150
           0...........
           0------
           170
     210
           )**************
           ()*******
 220
230
           0 . . . . . . . . .
      94
           0 * * * * * *
      61
           0 *****
 240
 25U
         () () ###
           (1+++
           0***
 290
 300
      16
 310
      10
 320
 330
 360
 370
      ()
 380
 390
 400
 410
NUMBER OF SPEEDS GREATER THAN 410 = 0 NUMBER OF OBSERVATIONS = 7100
                                                       MEAN SPEED = 107 MM/SEC
```

FIG. 7A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH AUGUST 28, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES
UBSERVATION PERIOD, FROM 9. 5/10/ 7/69 TO 16.15/20/ 8/69

MEAN	FREQUE	NC Y	0 50	100	150	200	250	300	350	400	450	500
DIR.	NO. F	CT.	I I	1	I	1	1	I	1	1	1	1
0	307	4	0		********				•			•
5	199	3	0	*******								
10	201	3	0									
15	232	3	0									
20	222	3	0									
25	161		0				•••					
30	125		0									
35	117		0									
40	97		0									
45	106		0									
50	95		0									
55	100		0									
60	97	_	0									
65 70	96		0									
	84		0									
75	98	-	0									
80	84		0									
85	81	_	0									
90	102		0									
95	100		0									
100	107		0									
105	84		0									
110	73	1	0									
115	84		0									
120	83		0									
125	101		Decessor									
130	100		0									
135	101		0									
140	76		0									
145	70		0									
150	59		0									
155	69	-	0									
100	71	1	0									
145	67	-	***********									
170	62	-	0									
175	77	_	0									
180	68		***********									
185	40	-	***********									
190	69	-	************									
195	80	-		••								
200	42	-	**********									
205	57	-	0									
210	46		0									
215	46	1	000000000									
230	49		-									
225	98											
230	59	1	0									
235	44	1	0									
240	35	-	0									
245	28	-	0									
250	17		0000									
299	33		-									
260	25											
265	37	1	0									
270	40	1	0									
275	21		0 ****									
280	44	1	0									
285	43	1	0									
296	41	1	0									
295	66	1	0									
360	58	1	0									
309	70	1	0									
310	97	1	0									
315	118	2	0									
320	129	2	0									
325	157	2	0									
330	105	3	0									
335	189	3	0									
340	217	3	0									
345	276	*	0									
350	234	3	0									
355	259	4	0									

NUMBER OF OBSERVATIONS - 7100

FIG. 7a. A HISTOGRAM OF DIRECTION ("TRUE), WITH CLASS INTERVAL OF 5", FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH ANGUST 28, 1969.

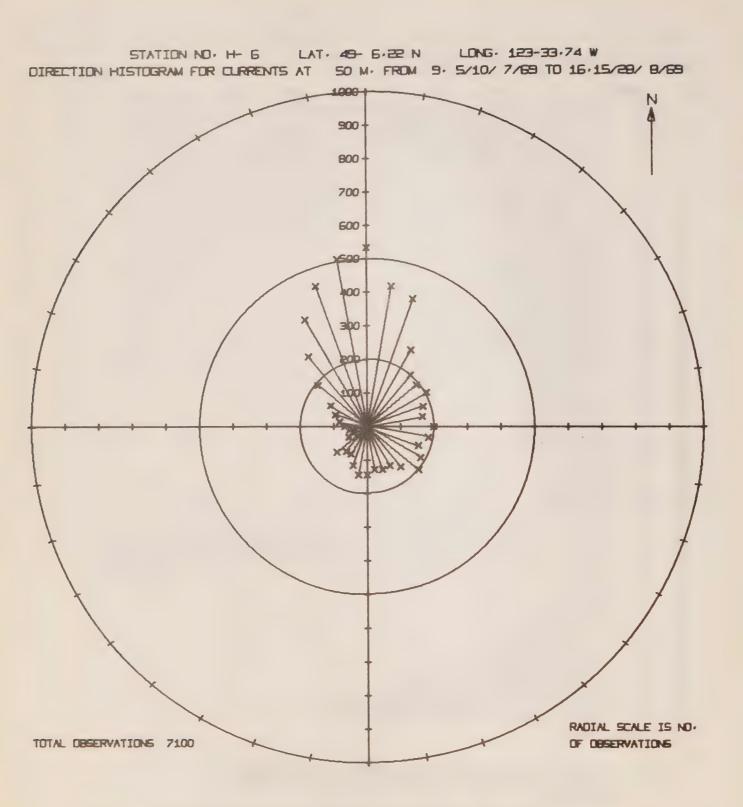
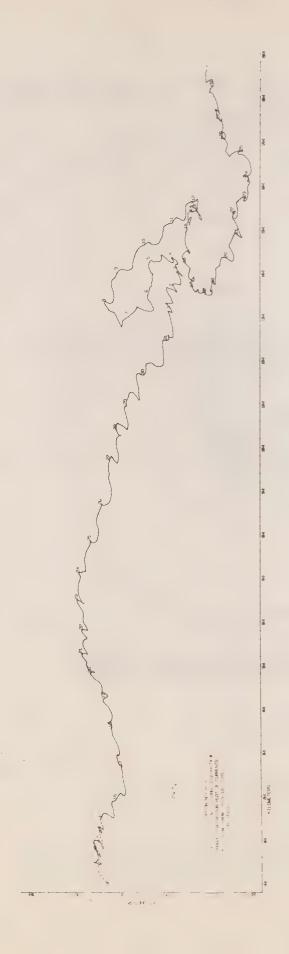


FIG. 7c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH AUGUST 28, L969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS DESERVATION PERIOD, FROM 9. 5/10/ 7/69 TO 16.15/28/ 8/69

											,	
MEAN	FREQUEN	ICY I	0 100	200	300	400	500	600	700	800	900	100
TEMP.	NO. PO	т.	I I	I	1	I	I	I	I	I	I	
8.00		C										
8.05	0		0									
8.10	0	0	0									
3.15	0	0	0									
8.20	0	0	0									
8.25	0	J	0									
8.30	0	0	0									
8.35	0	0	0									
8.40	0	0	0									
8.45	0	0	0									
8.50	0	-	3									
8.55	0		0									
8.60	0		0									
8.65	4		0									
8.70	9		0+									
8.75	118		0 *** *** ***									
8.80	97		0 ********									
8.85			0 * * * * * * * * * * * * * * * * * * *					*******		* *		
8.90			0			********		**********				
8.75			0					*********	****			
9.00	549		0		*********	*********	********	**				
9.05	209	_	0 * * * * * * * * * * * * * * * * * * *									
9.10 9.15	188 267		O									
9.20	318		0		****							
9.25	333		0									
9.30	263		0	*******	***							
9.35	267		0									
9.40	254	4										
9.45	281		0	*******	****							
9.50	351		0			**						
9.55	292		0		*****							
9.60	229	3	0 **********									
9.65	196	3	0	*****								
9.70	154	2	0									
9.75	140	2	0	•								
9.80	73	1	0									
9.85	36		0 * * * *									
9.90	143	_	0 *** * * * * * * * * * * * * * * * * *	•								
9.95	81	_	0*****									
10.00	28		0***									
10.05	39		() * * * *									
10.10	34		0***									
10.15	16		0**									
10.20	10	0	0*									
NUMBER	OF TEMP.	GRE	ATER THAN 10.20) *)	NUMB	ER OF OBSE	RVATIONS =	7100	MEAN	TEMP = 9	.22 DEG. (C.

FIG. 7D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH AUGUST 28, 1969.



west components of current velocity from records obtained at 10-minute intervals over 49-day period during July 10 through August 28, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the A progressive vector diagram constructed from successive cumulative values of north-south and eastsame as at this location. Fig. 7e.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 18.35/28/ 8/69 TO 15.37/18/ 9/69

M = A	N P	FRED	UENCY	o .	50	100	150	200	250	300	350	400	450	500
	EED		PCT.		Ī	1	1	I	I	I	ī	ī	1	1
	0	0		0				•		•	•	•		•
	10	71	2	0*****	****									
	20	70	2) * * * * * * * *	****									
	30	95	3	· · · · · · · · · · · · · · · · · · ·	* * * * * * * * *	**								
	4)	147	5)==+***	******									
	50	139	5	-	******		* * *							
	60	238	8	0*****	******		******	********	***					
	70	176	6	() * * * * * * * *	*****			• •						
	80	283	7	0					*********					
	90 100	174	6	0 = = = = = = = = = = = = = = = = = = =				* *						
	110	245	8	0				*						
	120	155	5	0 ******					****					
	130	238	8	0										
	140	139	5	0******	******									
	150	180	6	0 * * * * * * *	******			***						
	160	95	3)******										
	170	73	2	0******	*****									
	190	96	3	0 * * * * * * *	*****						•			
	190	58	2	O * * * * * * * * * * * * * * * * * * *	***									
	200	75	2	0******										
	210	41	1	()******										
	220	32	1	0 * * * * * *										
	230	8	0	0 * *										
	240	2	U'											
	250	6	0	0*										
40	MBER (OF SPE	EEDS G	REATER THA	N 250 =	= 0	NUM	BER OF OBSE	ERVATIONS =	3008	MEAI	N SPEED =	104 MM/SE	

FIG. 8A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH AUGUST 28, 1969.

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 18.35/28/ 8/69 TO 15.37/18/ 9/69

MEAN	FREQUE	NC V	0 50	100	1:60	200	250	200	250	600	450	500
				100	150	200	250	300	350	400	450	500
DIR.	NO. P	CT.	I I	I	I	1	I	1	Ī	I	I	ī
0	215		0		********	*******						
5	189		0			12 * * * *						
10	138	5	0.									
15	114		0									
20	1 85		0 **********									
25	101	3	() * * * * * * * * * * * * * * * * * * *									
30	87	3	0									
3.5	83		0									
40	82	3	0									
45	81	3	0									
50	69			_								
			0 ******									
5.5	56	2	0									
60	36	1	0 * * * * * *									
65	37		0 * * * * * * *									
70	29		0****									
75	30	1	0 * * * * *									
80	26	1	0 * * * * *									
85	18		0***									
90	26		0 * * * * *									
95	13	0	0+++									
100	15	0	0 * * *									
			0****									
105	20											
110	29		0****									
115	32	1	0 = = = = =									
120	18		0 * * * *									
125	17		0 * * *									
130	17	1	0 * * *									
135	23	1	0 * * * * *									
140	15		0***									
145	11	0	0**									
150	26	1	0 ****									
155	15		0+++									
160	10		0 * *									
165	5	0	0#									
170	5		0*									
175	10		0**									
180	8	0	0 * *									
135	9	0	0 * *									
190	7		0#									
195	9		0 * *									
200	7	0	0#									
205	4		0 =									
210	6		0 *									
215	8	0	0 * *									
220	9	0	0**									
225	7		0#									
230	9		() # #									
235	5	0	0*									
240	6	0	0*									
245	5		0*									
250	14		0***									
255	15	0	0 * * *									
260	16	1	0***									
265	17		0***									
270	13		0***									
275	10	0	0 * *									
280	13	0	0 * * *									
285	19		0++++									
290	22	1	0 = = = =									
295	20	1	0 * * * *									
300	17		0 * * *									
			0 = + + =									
305	21	_										
310	46	2	0 *****									
315	40	1	0 = = = = = = =									
320	53		0									
325	60		() * * * * * * * * * * * *									
330	68	2	0 * * * * * * * * * * * * * * * * * * *									
335	71		0									
340	103		0									
345	115	4	0 ******	******								
350	129	4	0		***							
355	144		0*********									
272	Total	2	U									

NUMBER OF OBSERVATIONS = 3008

FIG. 8B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W
DIRECTION HISTOGRAM FOR CURRENTS AT SO M. FROM 18.35/28/ 8/69 TO 15.37/18/ 9/69

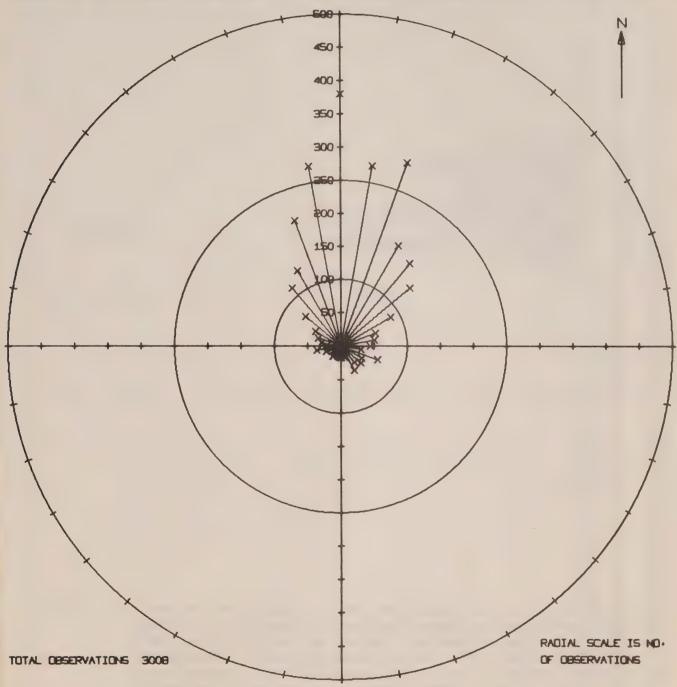


FIG. 8c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS OBSERVATION PERIOD, FROM 18.35/28/ 8/69 TO 15.37/18/ 9/69 MEAN TEMP. 8.00 8.05 8.10 FREQUENCY 0 NO. PCT. 1 0 0 0 0 0 0 400 450 100 250 150 50 8.30 8.40 8.45 8.50 8.55 8.60 8.65 8.70 8.75 8.80 8.85 8.90 9.05 9.00 9.05 9.10 9.15 65 103 115 179 203 165 145 130 152 203 252 272 154 255 274 9.25 9.30 9.35 9.40 9.45 9.55 9.60 9.65 9.70 9.75 9.80 9.95 206 10.05 10.10 10.15 10.20 10.25 10.30 10.35 10.40 10.45 10.50 10.55 0 10.65

10.75 10.80 10.85 10.90 10.95 11.00 0000 0 0 11.10 11.15 11.20 0 11.25 11.30 11.35 11.40 11.45 11.50 11.55 11.60 11.65 11.70 11.75 0 0 0 0 0 0 0 0 11.85 000 0 12.00 12.05 12.10 12.15 12.20 12.25 12.30 12.35 12.40 12.45 12.50 0 0 0 0 1 12.55 12.60 12.65 12.70 12.75 12.80 12.85 12.90 0 0 0 NUMBER OF TEMP. GREATER THAN 12.95 = 4 NUMBER OF OBSERVATIONS - 3008 NEAN TEMP = 9.39 DEG. C. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS

FIG. 8p. OBTAINED AT 10-MINUTE INTERVALS OWER 21-DAY PERIOD DURING AUGUST 28 THROUGH

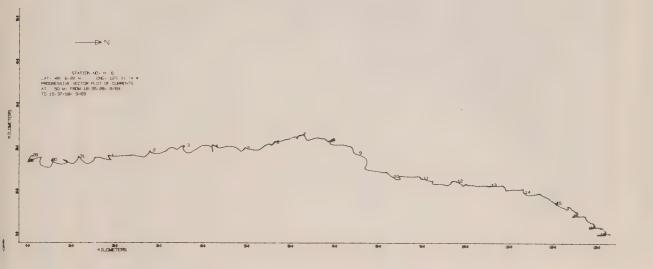


Fig. 8e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 21-day period during August 28 through September 18, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 17.57/18/ 9/69 TO 12.29/16/10/69

MEAN	FREQU	JENCY	0 50	100	150	200	250	300	350	400	450	500
SPEED	NO.		I I	1	I	I	I	I	1	I	Ţ	1
0	0	0	0									
10	52	1	0 ********									
20	55	1	0 * * * * * * * * * * * *									
30	47	1	0 * * * * * * * *									
40	100	3	0									
50	88	2	0									
60	157	4	0									
70	139	3	0	*********								
80	230	6	0******			********	***					
90 100	172 187	4	0			•						
110	307	5 8	0			••••						
120	201	5	0======================================									
130	314	8	0									
140	182	5	0			***						
150	235	6	000000000000000000000000000000000000000									
160	165	4	0									
170	153	4	() **********									
180	184	5	0 **********			****						
190	143	4	0 **********									
200	187	5	()*********	********	********							
210	88	2	0									
220	115	3	0 *** * * * * * * * * * * * * * * * * *	*********								
230	73	2	0 *********	8 to 40								
240	63	2	0 *****									
250	84	2	0********	****								
260	42	1	0 ******									
273	57	1	0 *********									
280	33	1	0*****									
290	33	1	0*****									
300	14	0	0***									
310	17	Ü	0 * * *									
320	25	1	0****									
330 340	30 18	1	0 * * * * *									
350	10		0++									
360	10	J.	0									
300	1	U	1)									
NUMBER	OF SPEE	DS G	REATER THAN	360 = 0	NUM	BER OF OBS	ERVATIONS :	= 4001	MEA	N SPEED =	142 MM/SI	EC

FIG. 9a. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES JESERVATION PERIOD, FROM 17.57/18/ 9/69 TO 12.29/16/10/69

MEAN	5050	HENCY	2 62	10		150	200	250	300	250			
DIR.		PCT.			I	150 2	1 00	250 I	300	350	400	450	500
0	254	6	0						I	I	I	I	1
5	173	4	0 *******										
1.5	167	4	0 * * * * * * * * *										
15	155	4)										
20	192	5	0 *******										
25	116	3	0 *** * * * * * * * * * * * * * * * * *										
30	96	2	(• • • • • • • • •										
35	87	2	0******										
40	78	2	(******										
45	80	2	0 *** * * * * * * * * * * * * * * * * *										
50	58	1	0 * * * * * * * * *										
55	66	2	0 ********										
50	77	2	0 ********										
65	52	1	() ********										
70	44	1) * * * * * * * *										
75	30	1	0 * * * * *										
80	28	1	0 *****										
85	20	1	0 * * * *										
20	17	U	0 * * *										
95	26	1	0 * * * *										
100	11	0	0 • •										
105	22	1	0 * * * *										
110	12	0	0 * *										
115	15	0	0 * * *										
120	22	1	0****										
125	18	0	0****										
130	25	1	0 * * * * *										
135	25	1	0 * * * * *										
140	13	0	0***										
145	21	1 0	0.00										
150 155	17 27		0 * * * *										
160	16	1	0+++										
165	20	1	0***										
170	25	ì	0****										
175	45	1	0										
180	23	1	0 * * * * *										
185	49	1	0										
190	76	2	0 ********										
195	69	2	0 ********										
200	54	1	0 ********	*									
205	56	1	0	*									
210	45	1	0 *******										
215	41	1	0										
220	45	1	0 *** * * * * * * * * * * * * * * * * *										
225	41	1	0 * * * * * * *										
230	35	1	0 * * * * * * *										
235	29	1	0 * * * * * *										
240	29	1	0 *****										
245	19	0	0 * * * *										
250	34	1	0 * * * * * * * *										
255 260	36 40	1	0 * * * * * * * *										
265			0 ******										
270	38 37	1	0										
275	24	1	0****										
280	25	î	0 * * * * *										
285	18	ô	0 * * * *										
290	19	ő	0 * * * *										
295	33		0 ******										
300	31		0 * * * * *										
305	28	ī	0 * * * * *										
310	42	1	0 ******										
315	42	1	0 * * * * * * * *										
320	34	1	0 * * * * * *										
325	32	1	0 * * * * *										
330	58	1	0										
335	112	3	0 *******										
340	101	3											
345	143	4	0 * * * * * * * * * * *										
350	151	4	0										
355	162	4	0 * * * * * * * * *	********	******								

NUMBER OF OBSERVATIONS = 4001

FIG. 9B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

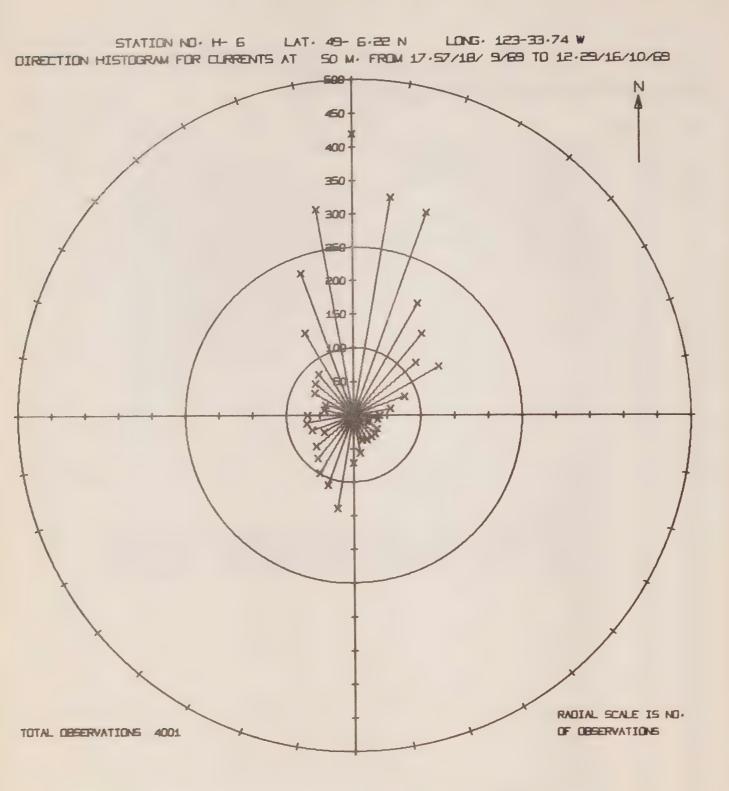


FIG. 9c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

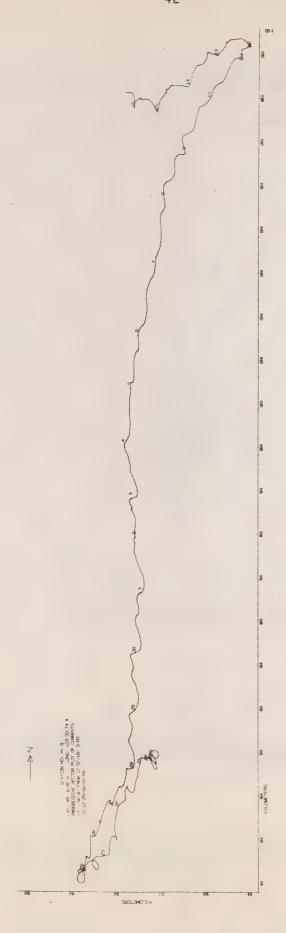
2000

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS JOSERVATION PERIOD, FROM 17.57/18/ 9/69 TO 12.29/16/13/69

MEAN TEMP.	FREQU NO.			400	000 I	800	1000	1260	1400	1600	1800	200
4.00	0	PCT.	0	I	1	1	I	1	1	I	1	
4.10	0	0	0									
4.20	0	0	0									
4.30	0	C	0									
4.40	0	0	0									
			0									
4.50	2	0	0									
4.60	0	C C	0									
4.70			3									
4.80	0	U	0									
4.90	0	0	0									
5.00 5.10	0	0	0									
5.20	0	Ü	0									
5.30	0	0	0									
5.40	0	ũ	0									
5.50	0	Ú	3									
5.60	o	0	0									
5.70	0	Û	.0									
5.80	0	3	2									
5.90	0	Š	ó									
0.00	0	Ö	0									
6.10	0	Ö	Ö									
6.20	1	Ö	Ö									
6.30	Ô	0	0									
6.40	0	ű	0									
6.50	0	ō	Ö									
6.60	0	ő	0									
6.70	ő	ō	0									
6.80	0	Ü	0									
6.90	Ö	õ	0									
7.00	Ü	ŏ	0									
7.10	Ö	ŏ	0									
7.20	ő	ō	0									
7.30	0	0	0									
7.40	0	Ū	0									
7.50	0	O	0									
1.60	0	0	0									
7.70	0	Ü	0									
7.30	0	C	U									
7.90	0	0	0									
8.00	0	0	0									
8.10	0	0	0									
8.20	0	0	0									
8.30	0	Ü	0									
8.40	0	Ú	0									
8.50	0	0	0									
8.60	0	0	0									
8.70	0	0	0									
8.80	14	0	0 *									
8.90	313	8	0********	****								
9.00	1313	33	0	*********	*******	******	*********	*********	***			
9.10	641	16	0 *********		*******							
9.20	724	18		********	********	**						
9.30	354	9	0 *** * * * * * * * * * * * * * * * * *	*****								
9.40	406	10	0 *********	******								
9.50	210	5	0 ********									
9.60	20	1	0*									
9.70	3	0	0									
NUMBER	OF TEMP	o. GR	EATER THAN 9.	70 = 0	NUMBE	R OF OBSI	RVATIONS =	4001	MEAN	TEMP = 9	.14 DEG. 0	C.

A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS FIG. 9D. OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.



components of current velocity from records obtained at 10-minute intervals over 28-day period during September 18 through October 16, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the A progressive vector diagram constructed from successive cumulative values of north-south and east-west same as at this location.

Fig. 9e.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 15.45/16/13/69 TO 12.21/25/11/69

MEAN SPEED	FREQU	PCT.	Ĭ	5) I	200 1	150	200	250 I	300 I	350 I	400 I	450 I	500
0	0	0	0										
10	223 153	4	0					**					
20 30	143	3 2	0 * * * * * * * *										
40	354	5	.,						********				
53	287	5	0		****			********					
60	419	7	0 ******	****	********								
70	254	4	.)******	****				******					
80	376	7	O******	****	******						• •		
90	275	5	?*******	*****		*******	*********	* * * * * * * * * *	**				
100	256	4	0******			********	********	******					
110	403	7) ******			********		*******	********	********	******		
120	261	5	0 *******				******	*******					
130	362	6	0 * * * * * * *				********	*******	********	******			
140 150	216 311	4	0 *** ***		********								
160	194	3	()******										
170	185	3	()******										
180	249	4)******					******					
190	129	2		****									
200	160	3				******							
210	108	2		****	*****								
250		2	()*****	****									
230		1)*****		^								
240		1											
250		1	0*****	*									
260	33		0*****										
270 290		1,	()***** .)****										
290			.)****										
300	-		0**										
310)**										
320			0***										
330	11	Û	3**										
340	6	ũ) *										
ر 5 د	5	5	0 =										
360			0 *										
370		3	2										
380	1	Q	С										
NUMBE	R UF SPE	EDS G	REATER THA	AN 38	0 = 0	NUM ·	BER OF OBS	ERVATIONS	= 5742	MEA	N SPEED =	114 MM/S	EC

FIG. 10A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOURAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES OF SERVATION PERIOD, FROM 15.45/16/10/67 TO 12.21/25/11/69

## FACE SURVEY 7 2 2 4 90 80 100 120 140 160 180 200														
112 2 2 3 3 3 3 3 3 3											140			
113 2 2 1 1 1 1 1 1 1 1								-	I		i.	ī	1	1
1									********					
1				0 ******					***					
10														
15									*****					
15								***						
1														
Signature Sign	4.5	57	1	^*******			*****							
55	+5													
1							******	*						
10														
			_											
O	70		1											
2. 23			1			• •								
10			1											
B														
10				0 *** * * * *										
11			1			•								
1														
1														
10			1											
160 50 1 10 10 10 10 10 10			ī				4							
1	132		ì											
1-0														
1			1											
10														
105			-						******					
17	16,		_											
70														
1		_	2						***					
175			î											
190 129			•		****	*****	******	*******	********					
12	2 90						*****	******			**			
10			7											
13			,											
275			-							***				
1			2											
10	*	1		****	****		******	******	**					
25 66 1)*********************************			_											
240 47 1								******	*****					
1			_											
15			1	~*****	*****									
267			7											
75														
17			1				*****							
75			1											
735 d5 1 feetaleseeseeseeseeseeseeseeseeseeseeseeseese		55			*****		***							
290			1											
175			1					*****						
10			1		******									
1			2) * * * = * * *	*****		******		***					
15					*****		******		*******					
127 194 3)***********************************			2											
158			5											
131 2													*******	* * * *
335 142 2			4	******		******	******	******	********		***			
145 164))	335	142	2	0.00000000		* * * * * * * * * *	******		********		******			
F) 13d - 1 December of the contract of the con														

,,,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,														
	, , ,	121												

TUMBER OF OBSCRIATIONS = 5742

FIG. 10B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

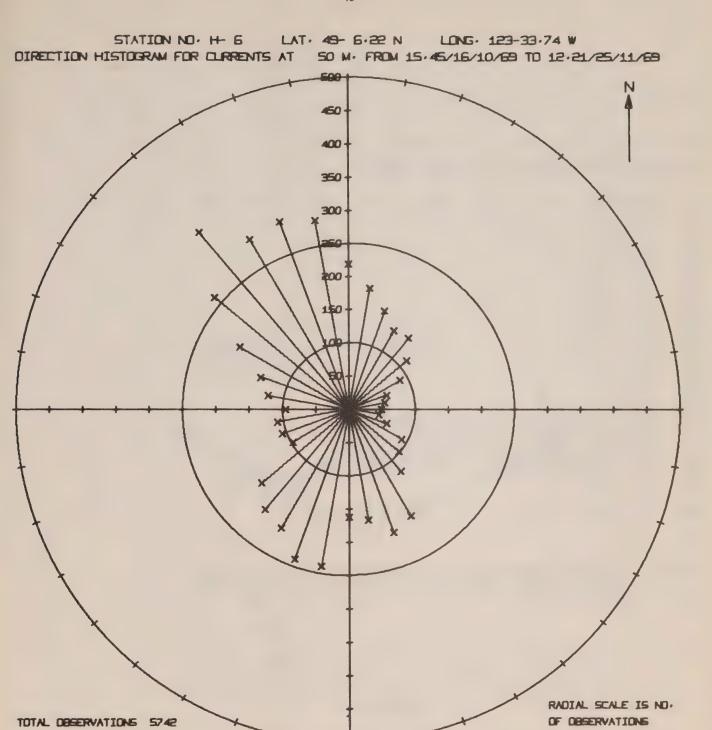


FIG. 10c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS OBSERVATION PERIOD, FROM 15.45/16/15/69 TO 12.21/25/11/69

MEAN	FREQU			40.	٥٥٥	800	1000	1200	1400	1600	1809	5000
TEMP.	NO.			I	I	ī	I	I	1	I	1	1
8.00	0		0									
8.05	0	0	0									
3.10	0	0	0									
8.15	0	0	0									
8.20	0	0	0									
3.25	0	0	0									
მ.30 პ.35	0	0	0									
0.40	0	0	0									
8.45	0	0	0									
8.50	0	0	3									
8.55	ő	5	0									
8.60	ő	0	0									
3.65	0	Ü	0									
8.70	ō	0	0									
8.75	0	0	0									
8.30	0	0	J									
6.85	0	0)									
8.90	0	0	7									
8.95	0	0)									
9.00	5	0	0									
9.05	730	13	() * * * * * * * * * * * * *		********							
9.10	1090	19	0		*******		********	* *				
9.15	1067	19	0*********		********		********					
9.20	830	14	0	*****	*********	*******						
9.25	811	14	0*****	******	*********							
9.30	842	15		*******	*********	*******						
9.35	312	5	0	* * * *								
9.40	45	1	0++									
9.45	10	0	0+									
NUMBER	OF TEMP	. GRE	EATER THAN 9.	45 = 0	NUMBE	ER OF JBSE	RVATIONS =	5742	MEAN	7849 = 9	.19 DEG. 1	

FIG. 10. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

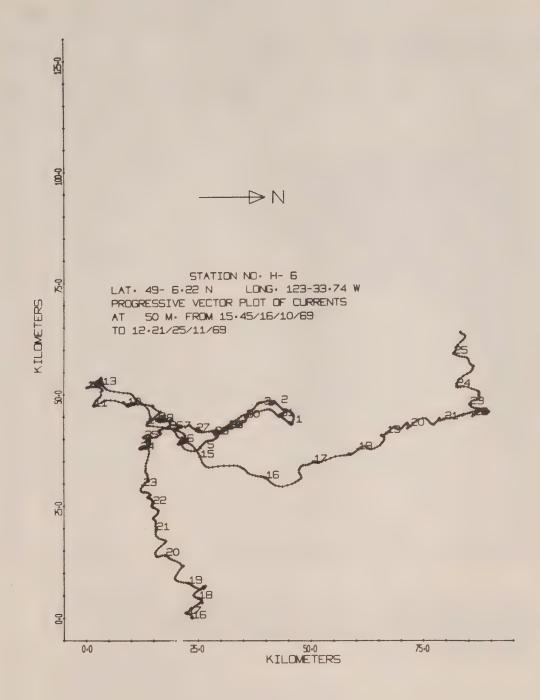


Fig. 10e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 40-day period during October 16 through November 25, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 16.39/25/11/69 TO 9.40/14/ 1/70

MEAN SPEED	FREQU	JENCY PCT.		200	300 I	400 I	500 I	600 I	700 I	800 1	900	1000
3, 2, 2, 0	0	0	0	*		•	•	•	•	•	,	
10	154	2	0									
20	98	1	0 * * * * * * * * * *									
30	133	2	0 *** * * * * * * * *									
40	310	4	0		*****							
50	268	4	0		****							
60	451	6	0		******	********	* *					
70	301	4	0 *** * * * * * * * * * * * * * * * * *		*****							
80 90	504 376	7 5	0 * * * * * * * * * * * * * * * * * * *			****						
100	360	5	0*******			***						
110	498	7	0 * * * * * * * * * * * *		******	*********						
120	308	4	0		******							
130	446	6	0 *********				* *					
140	254	4	0		* *							
150	403	6	0		******	*****						
160	255	4	0 *** * * * * * * * * * * * * * * * * *		***							
170	268	4	0 *** * * * * * * * * * * * * * * * * *		***							
180	362 170	5	0 * * * * * * * * * * * * * * * * * * *		*******	***						
190 200	214	2	- T									
210	100	1	0******									
220	140	2	0 *** * * * * * * * * *									
230	77	1	0 * * * * * * *									
240	84	1	0 * * * * * * *									
250	94	1	0 * * * * * * * * *									
260	61	1	0 * * * * *									
270	80	1	0 * * * * * * * *									
280	41	1	0 * * * *									
290 300	47 33	1	0****									
310	33 47	1	0****									
320	49	1	0****									
330	43	ī	0***									
340	36	1	0 * * * *									
350	18	0	0 * *									
360	16	0	0++									
370	16	0	0**									
380	14	0	0*									
390 400	10	0	0*									
410	5	0	0*									
420	í		0									
430	6	0										
440	2	0	0									
450	3	0	0									
NUMBER	OF SPEE	DS GI	REATER THAN	450 = 0	NUM	BER OF OBS	ERVATIONS :	= 7161	MEAN	SPEED =	±31 MM/SE	С

FIG. 11A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 50-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 14, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 16.39/25/11/69 TO 9.40/14/ 1/70

MEAN	FREQUENCY	0 50 100 150 200 250 300 350 400 450 50
DIR.	NO. PCT.	
0	211 3	0
5	155 2	0
10	146 2	() ***********************
15	167 2	0 **********************
20	212 3	0*****************************
25	118 2	0
30	120 2	0 *************
35	133 2	() = = = = = = = = = = = = = = = = = = =
40	91 1	() *************
45	121 2	0 *****************
50	99 1	0***********
55	92 1	0*******
60	83 1	0 *************************************
65	57 1	0******
70	49 1	0******
75	55 1	0******
80	41 1	0 ***
85	45 1	000000000000000000000000000000000000000
90	31 0	0000000
95		.0essee
100	53 1	000000000000000000000000000000000000000
105 110	50 1 54 1	000000000
115		() ************************************
120	45 1 32 0	0*****
125	49 1	00000000000
130	59 1	0seessass
135	45 1	0.0000000000000000000000000000000000000
140	73 1	() *************
145	75 1	0**********
150	66 1	()*******
155	86 1	()**********
160	85 1	()************************************
165	117 2	0 *************
170	117 2	0 ****************
175	120 2	() *********************
180	116 2	0**************
185	117 2	0
190	106 1	() ***************
195	105 1	0 ***************
200	102 1	0.0000000000000000000000000000000000000
205	81 1	(00000000000000000000000000000000000000
210	69 1	() ************************************
215	52 1	0 ********
220 225	54 1 58 1	()
230	57 1	0*******
235	45 1	()========
240	56 1	0*******
245	49 1	()*********
250	39 1	(000000000
255	62 1	()********
260	52 1	0******
265	68 1	0********
270	71 1	0 ********
275	79 1	()**********
280	68 1	0 = = = = = = = = = = = = = = = = = = =
285	60 1	() * * * * * * * * * * *
290	87 1	() ***********
295	118 2	0 **************
300	113 2	0 ***************
305	99 1	0 ****************
310	104 1	0*************
315	141 2	0 ************************
320	141 2	0 *******************
325	217 3	
330		0
335	262 4	()*********************************
340 345	238 3 247 3	
350	219 3	
355		0.000.0000.0000.0000.0000.0000.0000.0000
	217 2	

NUMBER OF OBSERVATIONS = 7161

FIG. 11B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 50-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 9, 1970.

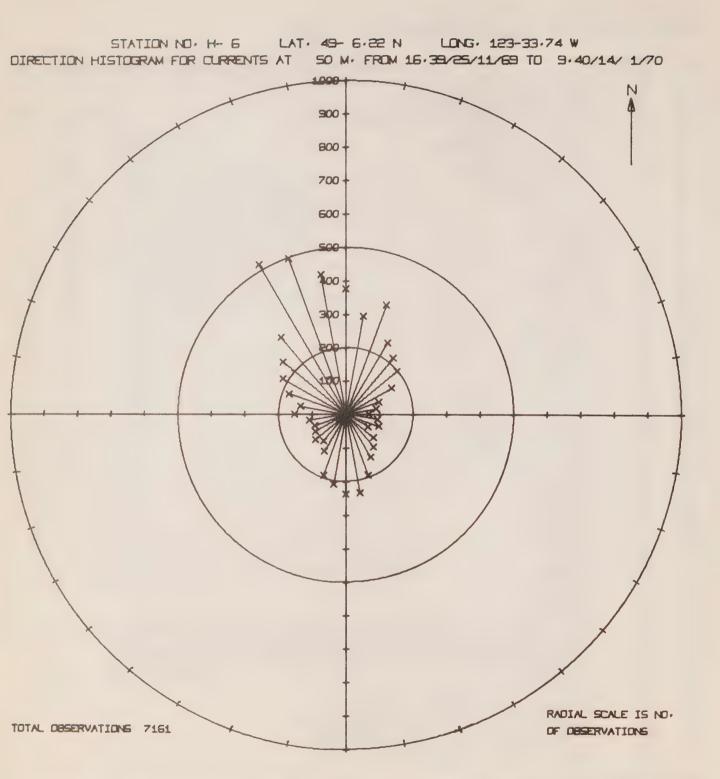


FIG. 11c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 50-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 14, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS DESERVATION PERIOD, FROM 16.39/25/11/69 TO 9.40/14/ 1/70

MEAN	FREQ	UE NC Y	0 500	1000	1500	2000	2500	3000	3500	4000	4500	50
TEMP.		PCT.		1	1	I	I	I	I	I	I	
8.00	0	0)							•	•	
8.05	0	0	0									
н.10	0	0	0									
8.15	0	0	0									
8.20	6	0	0									
H.25	6	0	0									
4.30	9	0	0									
d.35	10	0	0									
4.40	119	2	() # #									
0.45	58	1	() #									
8.50	52	1	0*									
8.55	78	1	() * *									
8.60	288	4	() * * * * * *									
8.65	646	9	() * * * * * * * * * * * * * * * * * * *									
8.70	594	8	()*********									
B.75	412	6	() * * * * * * *									
8.80	166	2	() * * *									
8.85	356	5	() * * * * * *									
8.90	387	5	0******									
d.95	728	10	() * * * * * * * * * * * * *	* * *								
9.00	812	11	0*********	***								
9.05	2151	30	J * * * * * * * * * * * * * * * * * * *	********	********	********						
9.10	249	3	() * * * * *									
9.15	32	U	0*									
9.20	2	0	0									
NUMBER	OF TEM	P. GR	EATER THAN 9.2	C = 0	NUMB	ER OF OBSE	RVATIONS =	7161	MEAN	TEMP = 8	8.88 DEG.	С.

FIG. 11D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 50-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 14, 1970.

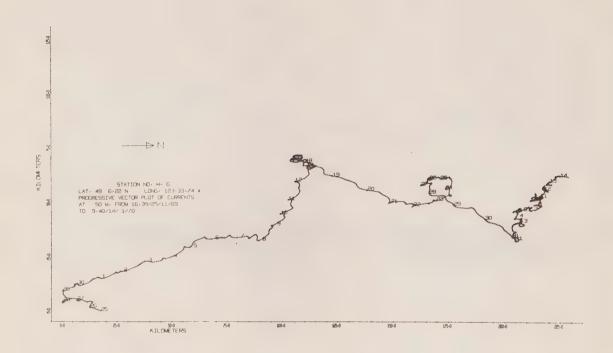


Fig. 1le. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 50-day period during November 25, 1969 through January 14, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 12.54/14/ 1/70 TO 9.27/19/ 2/70

MEAN	FREQUE NO. F	CT.	1 1	100	150 I	200 I	250 1	300 I	350 I	400 I	450 I	500
10	204) • • • • • • • • • • • • • • • • • • •									
20	108		0									
30	142		0		* * *							
40	338	7	0	*********	* * * * * * *							
50	241		() **********									
50	363	7	0 *********						*******			
10	273		() * * * * * * * * * * * * * * * * * * *									
80 40	3 d 6 2 4 3		0					*******		• • • •		
100	265	_	() * * * * * * * * * * * * * * * * * * *									
110	331		0				********					
120	194) **********									
133	324		0********				*********					
140	208	4	0 ******									
150	281	5	0			* * * * * * * * * * * *		1 44				
160 £70	147 151	3	0 * * * * * * * * * * * * *									
180	220	4)*****									
170	131	3) **********									
200	130	3	••••••••••									
210	85		0********									
220	78	2	~****	* * *								
230 240	56	1)*********									
250	48 58	1	0 * * * * * * * * * * * * * * * * * * *									
260	33	1	3*****									
270	24		0****									
683	15)	() * * *									
290	23		0****									
٥٥٥	11		∩ • •									
310 320	9 16	U	()***									
330	5	3										
343	ź		0									
350	1	O	0									
00t	1	2	9									
370	1	Ú	0									
390 90د	1	G	0									
400	2	0	1) 1) *									
410	4		2*									
420	i	·										
430	1	0	0									
440	1		0									
450	0		2									
460 470	0		0									
480	ő		0									
490	0	0	0									
500	0	Ü	C									
510	0		0									
520 530	. 0	ن 3	0									
540	. 0		()									
550	Ö	Ď	Ö									
560	O		C									
570	5	0										
580	0)										
590	0	0										
690 610	0	0	0									
620	0.	0	0									
630	ō	Ö	0									
640	0	O	0									
550	1	2	0									
NUMBER	OF SPEE	DS G	REATER THAN 6	50 = J	NU	MBER OF UBS	ERVATIONS =	5160	MEA	N SPEED =	113 MM/S	EC

FIG. 12A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 36-DAY PERIOD DURING JANUARY 14 THROUGH FEBRUARY 19, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTORIAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES
JPSCRVATION PERIOD, FROM 12.54/14/ 1/70 TO 9.27/19/ 2/70

MLAN	FREQU	ENCY	0 50	100	150	200	250	300	350	400	450	500
DIR.		PCT.		I	1	I	I	I	I	Ī	I	I
0	4:)	0	() * * * * * *									
j 10	23 31	1	0 * * * * * *									
15	34	i	0 * * * * * * *									
20	54	1	0 * * * * * * * * * * * * * * * * * * *									
25	37	1	() * * * * * * *									
30	33	1	0									
35	42	1	0									
40 45	43 38	1	0									
50	22	ŷ	0***									
55	17	Ċ	C # # #									
60	8	0	0**									
65	17	0	0 * * *									
7 J 7 S	14	0	0 * * *									
80	19	3	0****									
R5	16	0	0***									
40	10	0	() # #									
95	21	0	0 * * * *									
100	26	1	0****									
105 110	43 38	1	0 * * * * * * * * *									
115	45	1	0 * * * * * * * * *									
120	44	1	0									
125	46	1	0 * * * * * * * *									
130	53	1	0 * * * * * * * * * * * * * * * * * * *									
135	82 7 5	2	0 * * * * * * * * * * * * * * * * * * *									
145	108	2	0 *********									
1:0	138	3	0		****							
155	178	3	0									
160	178	3	0*********			* * *						
170	133	3	0 ***********									
175	224	4	0 * * * * * * * * * * *				* *					
180	247	5	0 *********									
185	246	5	0 **********									
190	235	5	0********				• • • •					
195 200	194	4	0									
2115	156	3	0********									
210	44	2	0 *********			\						
215	113	2	0 *** * * * * * * * * * * * * * * * * *									
220 225	73 50	1	0	* * *								
230	59	1	0									
235	62	1	0*******									
240	41	1	0 ******									
245	(1)	1) * * * * * * * * * * * * * * * * * * *									
250 255	37	1	0 ******									
260	37	1	0*****									
265	31	1	0 * * * * * * *									
270	35	1	() * * * * * * * *									
275 280	24	0	0 * * * * *									
285	16 30	0	0 * * * * * *									
290	22	ô										
295	38	1	0******									
300	57	1	0*******									
305 310	63	1	0 * * * * * * * * * * * * * * * * * * *									
315	105	2										
320	91	2	0									
325	122	2	0 *** * * * * * * * * * * * * * * * * *									
330	118	2	0 *** * * * * * * * * * * * * * * * * *		•							
335 340	101	2	() *** * * * * * * * * * * * * * * * * *									
345	62	1	0 *********									
350	58	1	0 *** * * * * * * * * * * * * * * * * *									
355	34	1	0 * * * * * *									

FIG. 12B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 36-DAY PERIOD DURING JANUARY 14 THROUGH FEBRUARY 19, 1970.

NUMBER OF UBSERVATIONS = 5160

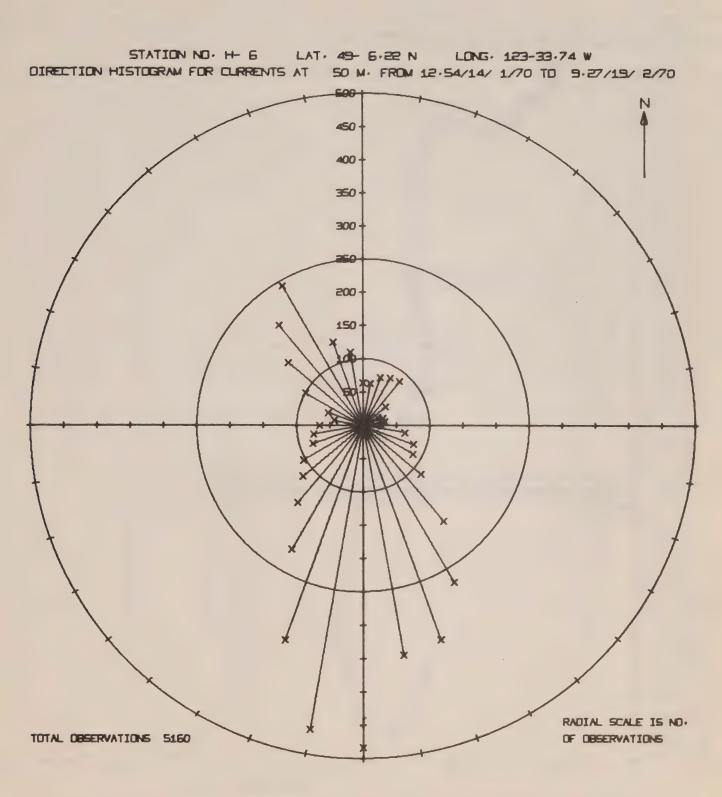


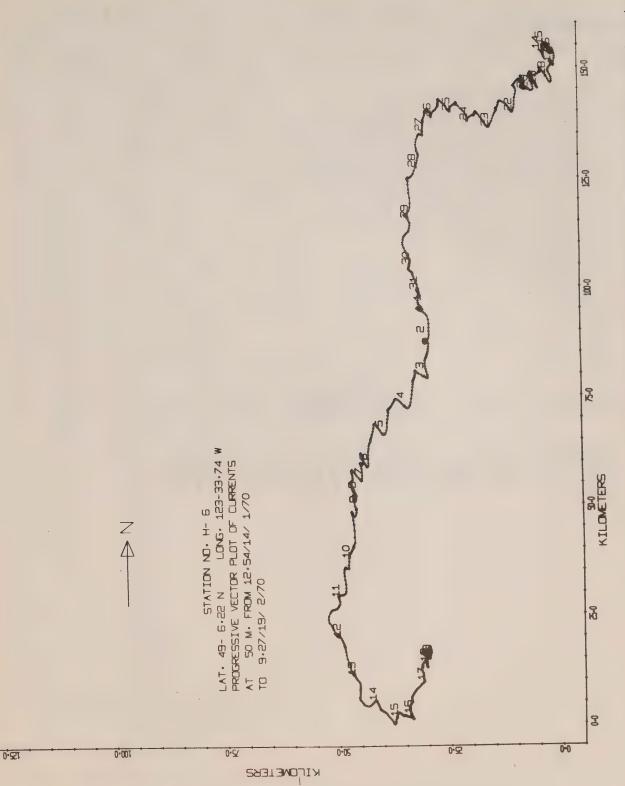
FIG. 12c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 36-DAY PERIOD DURING JANUARY 14 THROUGH FEBRUARY 19, 1970.

```
STATION NO. H- 6 LAT. 49- 6.27 N LONG. 123-33.74 W
```

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS DESERVATION PERIOD, FROM 12.54/14/ 1/70 TO 9.27/19/ 2/70

MEAN	FREQU			2) 🤈	300	400	500	600	700	800	900	1000
TCMP.		PGT.		I	I	1	I	ı	1	1	1	I
7.00	0		7									
7.05	0)	0									
7.10	()	7										
1.20	0	7)										
7.75	0) ()										
7.30	J		0									
7.35	0		9									
7.40	0		1									
7.45	0		0									
7.50	Ö		0									
7.55	11	į.	0*									
1.60	33	1	') * * *									
1.00	23)	() # #									
7.70	38	1	() # # # #									
1.75	46	1	() * * * * *									
1.30	33	1	0 * * *									
7.85	131	3	0	F # W								
7.70	85	4	U * * * * * * * * * * * * * * * * * * *									
7.95	324	6	0********		******							
n. 10	376	7	0********	**********		****						
5. 35	297	6) * * * * * * * * * * * * * * * * * * *		******							
B.10	182	4	0 *****									
0.15	150	3	0 *********									
0.20	120	2	0********	* *								
R.25	208	4	0 * * * * * * * * * * * * * * * * * * *									
n.30	541	10	0******					*				
3.35	705 330	14	0					*********	******			
3.45	289	6	0									
0.50	105	3	1*****									
0.55	556	11	0					***				
8.60	480	3)********									
0.65	36	í	0***									
0.00	, ,	_										
NUMBER	OF TEMP	, GR	EATER THAN	3.55 = 5	DaMUN	ER OF OBSE	ERVATIONS =	5160	MEAN 1	TEMP = 8	.27 DEG. C.	

FIG. 12D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 36-DAY PERIOD DURING JANUARY 14 THROUGH FEBRUARY 19, 1970.



January 14 through February 19, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 36-day period during same as at this location.

Fig. 12e.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 11.54/19/ 2/70 TO 13.59/25/ 3/70

MLAN	FREQU			50	100	150	200	250	300	350	400	450	500
SPEED	NO.			I	I	1	1	I	1	I	I	1	- 1
10	311		0										
20	149	6	()										
30	184	4	0										
40	406	3	0										
50	219	6	0****						4 * *				
60	414	8	0 ** * * *								*****		
70	239	5	0 ** * * *										
80	368	7	0							*******			
90	223	5	0 * * * * *					* *					
1.00	251	5	0 ****		********								
110	326	7	0 * * * * *			* * * * * * * * * * *				e et			
120	225	5	04***										
130	309	6	0 * * * * *	* * * * * * * *									
140	161	3	3****		*****	*******							
150	235	ŝ	0 * * * * *	*****	******	*********							
160	120	2	() * * * * *	*****	*****	á							
170	121	2	0	*****	********	•							
180	164	3	0****			********							
190	100	2	0****		******								
200	100	2	_		* * * * * * *								
210 220	46		0****										
230	68 29	_	0 *****		*								
240	23		0****	•									
250	15		0+++										
260	7	C	-										
270	7		0+										
280	6	ũ											
290	13		0***										
300	3	Ö											
310	5	0											
320	1		2										
330	1	Ü	0										
NUMBER	OF SPEE	DS GF	REATER	THAN 3.	30 =)	NUME	SER OF OBSI	ERVATIONS =	= 4909	MEA	N SPEED =	97 MM/SE	

FIG. 13A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10 MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPLED".

STATION NO. H- 6 / LAT. 49- 5.2? N LONG. 123-33.74 W

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 11.54/19/ 2/70 TO 13.59/25/ 3/70

MLAN	FREQU	JENCY	0 50	100	150 26	00 250	300	350	400	450	500
DIR.	NO.	PCT.		I	I	I I	I	1	1	1	I
0	75	2	()**********								
10	67 47	1	() * * * * * * * * * * * * * * * * * * *								
15	45	1	0****								
20	85	2	()**********	• •							
25	44	1	0								
30 35	31 26	1	0****								
40	35	1	0*****								
45	39	- 1	0 * * * * * * *								
50	29	1	0*****								
55 60	33 25	1)*****								
65	31	1)*****								
70	33	1	()****								
75	38	1	() * * * * * * * *								
10 15	18 32	f) 1)****								
90	32	1	0*****								
)5	45	1)******								
100	35	1	O*****								
105 110	5 I 3 8	1)*******)******								
115	50	1	0*******								
120	5.9	1	()********								
125	67	1)*********								
130 135	73 95	2	()************************************								
140	88	2) * * * * * * * * * * * * * * * * * * *								
145	120	2	0************								
150	143	3	0								
155 160	161 191	3	0 ************								
165	175	4	0 *** * * * * * * * * * * * * * * * * *								
170	190	4	0 ***********		**********						
175	204	4	()***********								
140 145	207 189	4	() *************			• • •					
190	143	3	0*********								
195	150	3	0 *** * * * * * * * * * * * * * * * * *		*****						
200 215	105 75	2	()***********	*****							
210	46	1	0 ******								
215	. 43	1	0******								
220	42	1	0								
225 230	39 34	1	0 * * * * * * * *								
235	29	1	0*****								
240	24	0	0****								
2 45 250	30	1	0*****								
255	24 25	1	0****								
260	23	ů	0****								
265	25	1	0 ****								
270 275	28 31	1	0 * * * * * *								
280	40	1	0*****								
285	45	1	0****								
290	43	1	() * * * * * * * * *								
295 300	46 43	1	(******								
305	52	1	0 *******								
310	48	1	0								
315 320	47	1	0 *********								
325	81 84	2	0 ************								
330	92	2	() *************								
335	102	2	0***********								
340 345	101 77	2	O*************	****							
350	70	1	7*********								
355	68	1	0 **********								

FIG. 13B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970.

NUMBER OF OBSERVATIONS = 4909

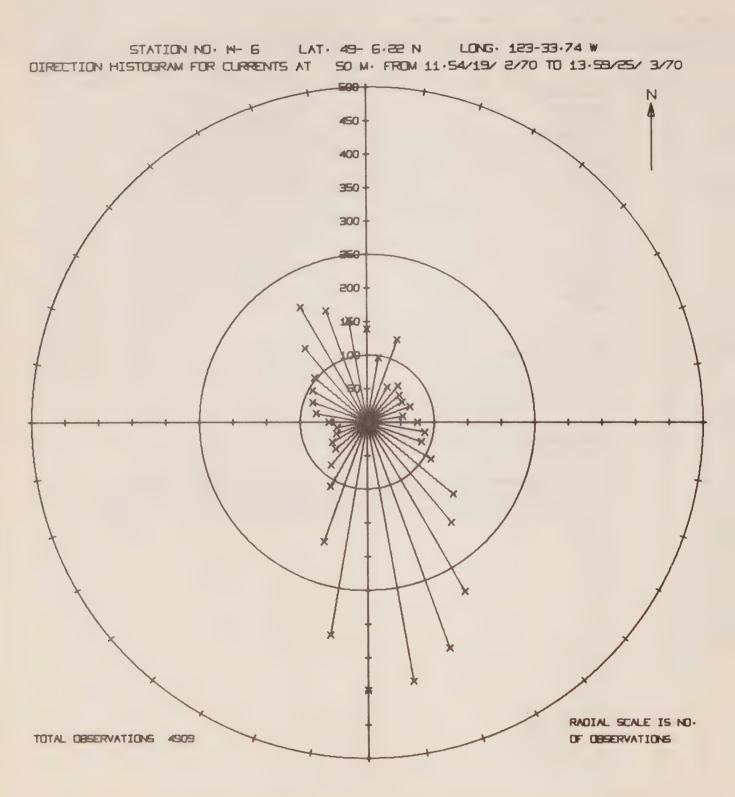


FIG. 13c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS DISERVATION PERIOD, FROM 11.54/19/ 2/70 TO 13.59/25/ 3/70

MEAN	FREQ	UENCY	0 100	200	300	400	500	600	700	800	900	1.00
TLMP.	NO.	PCT.	I I	I	1	Ĭ.	I I	I	1	Ī	Ī	
7.00	0	C	0									
7.05	()	(1))									
7.10	()	U	0									
1.15	0	3	1)									
7.20	O	0	J									
1.25	U	()	0									
1.30	0	J	Ú									
1.35	9	G.	Ú									
7.40	J	U)									
7.45	0	C	0									
7.50	0	J	U									
7.55	0	0	0									
7.00	3	0	0									
7.65	10	0	0*									
7.70	0	0	0									
1.15	133	3	0 *********									
1.30	113	2	0 *********									
7.35	128	3	·()**********									
1.90	279	6)********	*******	****							
1.95	399	8	0	********	*******	*****						
15.00	667	14) * * * * * * * * * * * * * * * * * * *	********	*******	******	********	*********	****			
٧.05	798	1.6)*********	*******	*******	******	********	********	********			
5.10	850	1.7	() * * * * * * * * * * * * *	******	******	********		********				
0.15	634	13	0	********	******	******	******	********				
5.20	414	8	0	******	*******	******						
0.25	241	2	0		*							
0.30	173	4	O	****								
0.35	91	2	0******									
3.40	6	U	() #									
VHMBER	OF TEM	P. 5K	EATER THAN 8.4	() = J	NUMB	ER OF OBSE	RVATIONS =	4909	MEAN	TEMP = 8.	06 DEG. C	

FIG. 13D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970.

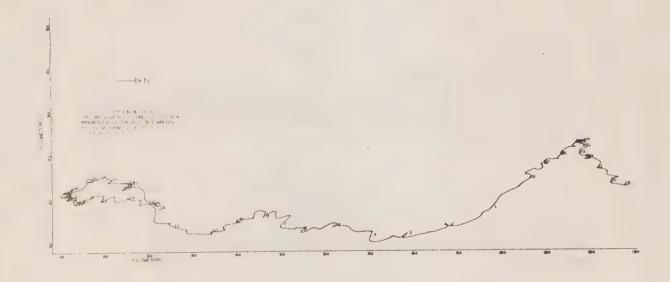


Fig. 13e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 34-day period during February 19 through March 25, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

400

500

600

700

800

MEAN SPEED = 149 MM/SEC

900

1000

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W

100

MEAN SPEED

10

20

30

FREQUENCY O NO. PCT. I

0 0

0

0 - - -

NUMBER OF SPEEDS GREATER THAN 380 = 0

0 ****

NO.

0

32

46

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 14.13/27/ 4/70 TO 13.15/ 8/ 6/70

200

300

60	149	2	0************
70	159	3	0
80	400	7	0
90	313	5	0
100	326	5	0 = = = = = = = = = = = = = = = = = = =
110	528	9	0**************************************
120	346	6	0.0000000000000000000000000000000000000
130	519	9	0**************************************
140	345	6	() = = = = = = = = = = = = = = = = = = =
150	498	8	0**************************************
160	262	4	0.0000000000000000000000000000000000000
170	248	4	000000000000000000000000000000000000000
180	323	5	000000000000000000000000000000000000000
190	211	3	()
200	307	5	()****************************
210	179	3	0000000000000000
220	224	4	0
230	109	2	() ************************************
240	89	1	0
250	97	2	0 = = = = = = = = = = = = = = = = = = =
260	68	1	0******
270	87	1	0 *** *** *** *** *** *** *** *** *** *
280	41	1	0****
290	59	1	0=====
300	17	0	0++
310	14	0	0.
320	15	0	0++
330	6	0	0+
340	11	0	0.
350	3	0	0
360	5	0	0.
370	1	0	
380	1	0	

NUMBER OF OBSERVATIONS = 6043

A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS FIG. 14A. OBTAINED AT 10-MINUTE INTERVALS OVER 42-DAY PERIOD DURING APRIL 27 THROUGH JUNE 8, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 14.13/27/ 4/70 TO 13.15/ 8/ 6/70

MEAN	FREQU	ENCY	a	50	100	150	200	250	360	350	00	450	600
DIR.		PC I.		1	1	1	1	1	1	1	400	450	500
0	274	5									1	I	I
5	217	4											
10	204	3				*******							
15	169	3											
20	168	3											
25	127	2					•						
30	102	2											
3.5	84	1											
40	77	î											
45	64	1											
50	62	1	000000										
55	74	ı											
60	70	î											
65	7.3	1											
70	53	ī	()										
75	54	1	() * * * * * * * *										
80	51	1	()										
9.5	65	1											
90	50	1											
95	5.3	1	/)										
100	46	1	1)										
175	41	1	0	0.0									
110	44	1	()										
115	45	1	() * * * * * * *										
120	41	1	0										
125	49	1	() * * * * * * *										
130	65	1											
135	54	1	() * * * * * *										
140	60	1	() * * * * * *										
145	68	1	() * * * * * *		a.								
150	64	1	0										
155	55	1	0										
160	76	1	0		0.0								
165	79	1	() * * * * * *										
170	105	2	() ** * * * * * *										
175	107	2	() • • • • • •										
180	103	2	700000										
185	86	1	0 = = = = =										
190	88	1	()										
195	6.3	1	13 0 0 0 0 0 0										
200	64	1			•								
205	63	i											
210	65	1											
215	82	1											
220	77	1											
225	48	1	() * * * * * * *										
230	51	1	()										
235	47	1	0										
240	43	Ţ	0										
245	54	1	()										
250	64	1											
255 260	64 40	1											
265	38	1	() * * * * * * *										
270	37	1	0										
275	46	1	()										
280	36	1	0										
285	60	1	() * * * * * *										
290	36	1	0										
295	41		()										
300	62		()										
300	75	-											
310	65												
315	85												
320	81												
325	101												
330	124												
335	132												
340	164												
345	207												
350	226							**					
355	210												

FIG. 14B. A HISTOGRAM OF DIRECTION (*TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 42-DAY PERIOD DURING APRIL 27 THROUGH JUNE 8, 1970.

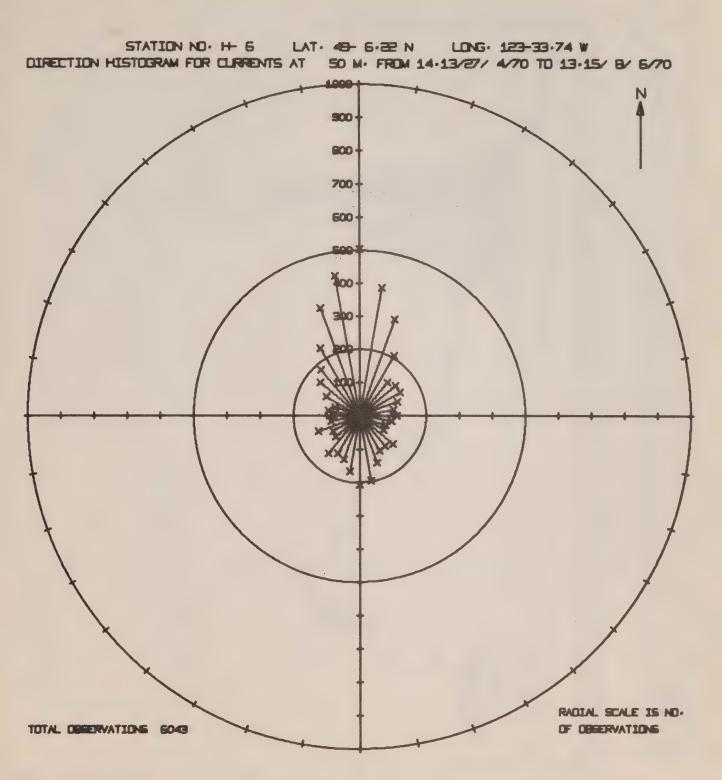


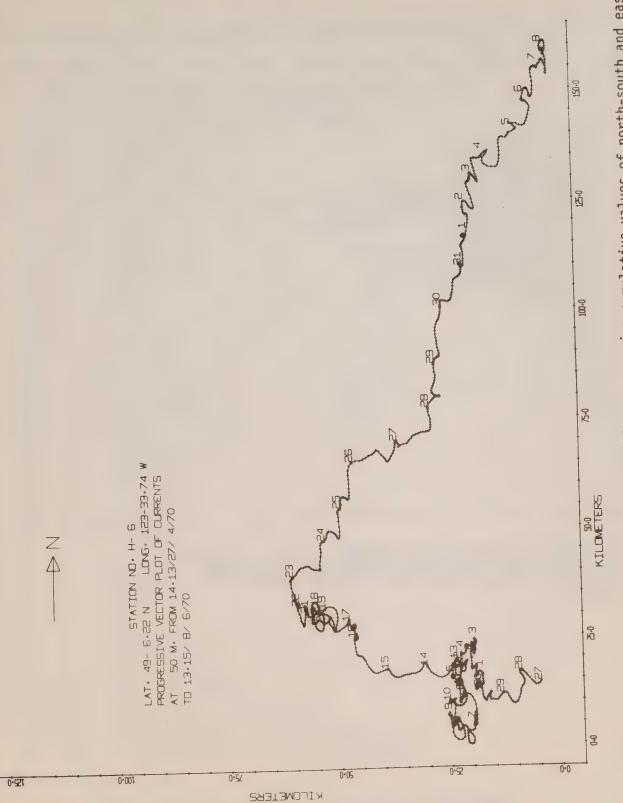
FIG. 14c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10° BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 42-DAY PERIOD DURING APRIL 27 THROUGH JUNE 8, 1970.

STATION NO. H= 6 LAT. 49- 6.22 N LONG. 123-33.74 W HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS INSERVATION PLRIOD, FROM 14.13/27/ 4/70 TO 13.15/ 8/ 6/70

```
FREQUENCY 0
NQ. PCT. I
0 0 9
0 0 0
0 0 0
                                                                     600
                                                                              700
                                                                                                900
500
                                                                                                        1000
                        100
                                 200
                                          300
                00000
10.00
10.05
10.10
10.15
10.20
                 0 0 0
10.20
10.25
10.30
10.35
10.40
10.45
10.55
10.65
NUMBER OF TEMP. GREATER THAN 10.95 = 2
                                            NUMBER OF OBSERVATIONS = 6043
```

A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS FIG. 14D. OBTAINED AT 10-MINUTE INTERVALS OVER 42-DAY PERIOD DURING APRIL 27 THROUGH JUNE 8, 1970.

MEAN TEMP = 6.97 DEG. C.



A progressive vector diagram constructed from successive cumulative values of north-south and eastwest components of current velocity from records obtained at 10-minute intervals over 42-day period water that would occur if the motion in the entire neighboring area of the location of the instruduring April 27 through June 8, 1970. The spatial scale corresponds to the displacement of the ment was the same as at this location.

Fig. 14e.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 9. 5/10/ 6/70 TO 12.13/27/ 7/70

MLAN SPEED O	NO. 0	UENCY PCT.	I 0	100 I	200	300 I	400 I	500 I	000 I	700 I	800	900	1000 I
10 20	0	0	7										
30	1		Ď										
40	8		0#										
50	46	1	0****										
60	164	2											
70 80	179 272	3			*****								
90	213	3											
100	252	4			********	+ m							
1.0	461	7	0=====					* * *					
120	348	5	0 ****		******	********	**						
130	647	10			*******		*******		• • • • • • • • • •	• •			
140 150	459 516	7	0					***					
160	290	გ 4	0*****				*************						
170	282	4	0*****		********	****							
180	450	7	0 * * * * *		*********		********	**					
190	298	4	0*****		*********								
200	382	6	0****	******	**********		****						
210	299	4	0+++++										
220	389 166	6	0****				*****						
240	124	2											
250	158	2											
260	68	1	0										
270	74	1	0 *** **										
280	60	1	0 * * * * * *										
290 300	60 27	1	0***	*									
310	20	0	0**										
320	24	0	0**										
330	15	0	() * *										
340	10	0											
350	8	0)#									ý	
360 370	3 6	0	0									*	
380	1	0	0										
390	1	Ü	0										
400	1	0	0										
410	3	0	0										
420	0	0	0										
430 440	1	0	0										
440	3	0	0										
NUMBER	OF SPE	EDS G	REATER	THAN 4	40 = 0	NUM	BER OF OBS	ERVATIONS :	= 6789	MEA	N SPEED =	159 MM/S	EC

FIG. 15A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 47-DAY PERIOD DURING JUNE 10 THROUGH JULY 27, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 9. 5/10/ 6/73 TO 12.18/27/ 7/70

MEAN		UENCY			100	150	200	250	300	350	400	450	500
UIR.	NO.	PCT.		I	I	I	Ī	- I	I	I	I	I	I
) 5	331 267	5 4								* * *			
10	241	4	0 *******				******	*****					
15	219	3	0 * * * * * * * *	*****		******	******						
20	223	3	0 * * * * * * * *				******						
25	147	2	0 ** * * * * * *										
30	123	2	0 * * * * * * * * *			*							
35 40	88 81	1	0*******										
45	86	1	0 *******										
50	82	1	0 *******										
55	60	1	0 *** * * * * * *										
60	63	1	0										
65 70	46 50	1	0 * * * * * * * * *										
75	45	1	()*******										
0.8	37	1	() * * * * * * *										
85	33)	0*****										
90 95	34 28	0	0 * * * * * *										
100	38	1	()******										
105	42	1	0******										
110	27	O	0****										
115	36	1	0*****										
120 125	33 43) 1	0 * * * * * * * * * * * * * * * * * * *										
130	57	1	0 ** * * * * * * *										
135	58	1	0 *******	***									
140	67	1	0 ******										
145 150	65 80	1	0 * * * * * * * * * * * * * * * * * * *		_								
155	82	1	0										
160	96	ī	0 *******										
165	110	2	0 * * * * * * * *										
170	97	1	0 ******										
175 180	110 126	2	0 * * * * * * * * * * * * * * * * * * *										
185	103	2	0			•							
190	86	1	() * * * * * * * *	*****	**								
195	75	1	0 *******										
200	77 53	1	0 * * * * * * * * * * * * * * * * * * *										
210	53	1	0 *** * * * * * *										
215	59	ī	.)										
220	45	1	^*******										
225	36	1	0										
230	57 67	1	0 * * * * * * * * * * * * * * * * * * *										
240	50	ī	0 * * * * * * * * *										
245	62	1	0 *** * * * * *	***									
250	46	1	0										
255 260	53 57	1	0 * * * * * * * * * * * * * * * * * * *										
265	53	1	0										
270	54	1	0 *******										
275	51	1	0 * * * * * * * *										
280 285	47 39	1	0 * * * * * * * * * * * * * * * * * * *										
290	65	1	() = = = = = = = =										
295	66	î	0 *******										
300	84	1	0 *******										
305	75	1	0 * * * * * * * *										
310 315	122	2 2	0 * * * * * * * * * * * * * * * * * * *										
320	119	2	0										
325	122	2	0 *******		• • • • • • • •								
330	183	3	3 * * * * * * * *										
335 340	172 200	3	0 * * * * * * * * * * * * * * * * * * *										
345	260	<i>3</i>	-										
350	264	4						*********					
355	272	4	0 *******	*****	*******	******	*****						

FIG. 15B. A HISTOGRAM OF DIRECTION (*TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 47-DAY PERIOD DURING JUNE 10 THROUGH JULY 27, 1970.

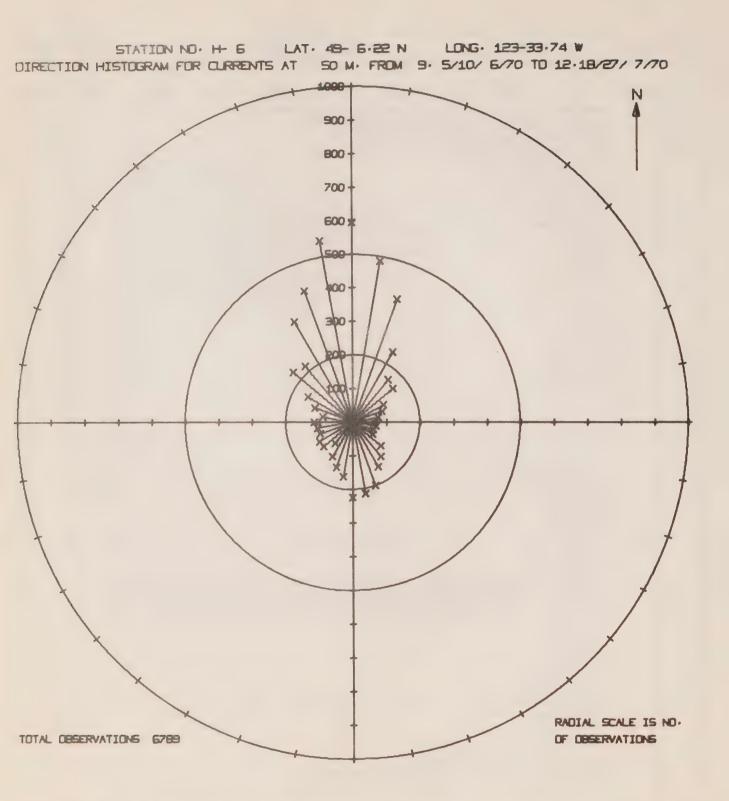


FIG. 15c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 47-DAY PERIOD DURING JUNE 10 THROUGH JULY 27, 1970.

(ISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF -50 METERS DISCRVATION PERIOD, FROM $-9.\ 5/10/\ 6/70$ to 12.18/27/ 7/70

VALAN		UENCY		100	200	300	400	500	600	700	800	900	100
TIMP.	NO.	PCT.		I	I	I	I	I	I	I	1	I	
7.00	16 22	U	0**										
7.05 7.10													
	15 45	0	0 = = = = =										
1.15		1	0 * * * * *	_									
7.20	57	1	0										
1.25	164	2											
7.30	145	2		* * * * * * * * * *	•								
7.35 7.40	210	2	0****										
1.45	156	4		* * * * * * * * *									
7.50	185	2											
7.55	284	4											
1.50		2				****							
	168												
1.10	198	3 4	() * * * * *	* • • • • • • • • •									
7.75	225	3											
1.80	158	2	T.										
1.85	356	5					***						
7.90	152	2					***						
1.95	152	2											
1.00	192	٤	3										
1.05	519	5	0****										
8.10	282	4	0 * * * * *			****							
4.15	283	4	C			****							
3.20	543	8	0****										
3.25	184	3	0 * * * * *						-				
8.30	226	3	3****										
0.35	420	6	()****										
8.40	166	2	0 * * * * *	*******									
8.45	156	2	0****										
ช.50	276	4	0 * * * * *										
1.55	60	1	0 = = = =										
0.60	47	1	()****										
8.65	37	1	0 * * * *										
b.70	73	1	0 * * * * *	* *									
0.75	21	Ü	0**										
8.80	19	ō	() * *										
n.85	24	Ü	0++										
8.70	9	5	0 =										
8.95	19	0	0 * *										
9.00	29	. 0	0 * * *										
9.05	9	Ú	0.*								1		
7.10	5	Ú	C) #										
7.15	6	Ü	f) w										
9.20	1	Ü)										

FIG. 15D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 47-DAY PERIOD DURING JUNE 10 THROUGH JULY 27, 1970.

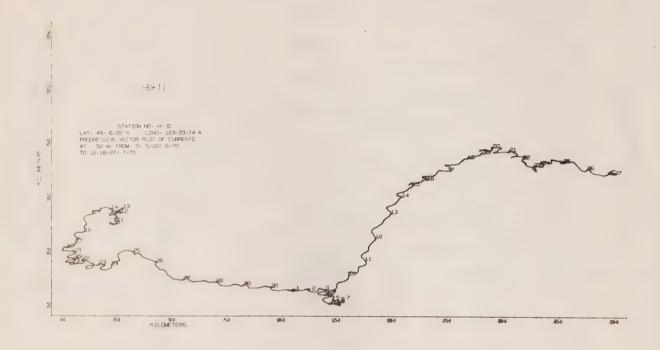


Fig. 15e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 47-day period during June 10 through July 27, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 16. 9/27/ 7/70 TO 14.25/24/ 9/70

MEAN		UENCY	
SPELD 0	NO. 0	PCT.	
10	0		0
20	Ö		
30	Ö	0	
40	4	0	
50	29	U	O***
60	106	1	0*****
70	118	1	0 *** *** *** ***
80	373	4	() ************************************
100	342 339	4	000000000000000000000000000000000000000
110	562	4 7	Ossessessessessessessessessessessessesse
120	401	5	000000000000000000000000000000000000000
130	684	8	0
140	526	6	
150	813	10	() ************************************
160	458	5	0.********************************
173	482	6	0*******************************
130	695	В	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
190	352	4	(0.88.0.80.0.80.0.0.0.0.0.0.0.0.0.0.0.0.
200 210	439	5	0.00.00.00.00.00.00.00.00.00.00.00.00.0
220	275 347	3 4	()
230	184	2	0 0 0 0 0 0 0 0 0 0
240	160	2	()=====================================
250	230	3	0***************
260	102	1	()*********
276	115	1	()=====================================
280	51	1	0*****
290	60	1	0*****
300	25	0	
310 320	19 30		0** ***
330	15	0	
340	25	0	
350	16	o o	0**
360	17	0	0**
370	13	0	?*
380	10	U	9.
390	9	0	0*
400	6	0	0*
410	8 7	0	0* 0*
420 430	7	0	0*
440	7	0	0*
450 .	í	0	0
460	5	0	0*
470	3	0	
480	6	0	0*
490	6	0	0.
500	3	0	
510	1	0	
520	1	0	
NUMBER	OF SPE	EDS 3	REATER THAN 520 ± 0 NUMBER OF OBSERVATIONS = 8467 MEAN SPEED = 163 MM/SEC

FIG. 16A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 59-DAY PERIOD DURING JULY 27 THROUGH SEPTEMBER 24, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES DASERVATION PERIOD, FROM 16. 9/27/ 7/70 TO 14.25/24/ 9/70

```
300
                                                                                                            400
                                                                                                                                   500
        FREQUENCY 0
                              50
                                        100
                                                   150
                                                               200
        NO.
ulR.
              PCT.
        379
         312
        224
         201
  23
30
35
         151
         110
         81
  60
65
70
         87
          89
          85
  80
          59
                    0 * * * * * * * * * * * *
  85
90
95
          69
                    70
                    68
 100
          64
                    0------
          78
 120
          70
          71
 .25
 130
          71
 135
         109
 150
         137
 155
160
         151
         187
         171
 165
         171
         131
 180
                    185
         133
         160
 195
         136
 200
         145
 205
         101
 210
          94
 220
          87
          90
 230
 235
          70
 240
          62
                    0 . . . . . . . . . . . . . . . . .
 250
          42
                    0 . . . . . . . .
 255
          68
                    () . . . . . . . . . . . . . . .
 260
          58
                    0 . . . . . . . . . . . . . . . . .
 265
          64
 270
          66
 280
 285
                    0-----
 290
          59
                    0 . . . . . . . . . . . .
 295
          69
 300
          61
 305
          94
         111
 325
         138
 330
         184
 335
         212
 340
         228
         248
 350
         252
         260
                    0-----
```

FIG. 16B. A HISTOGRAM OF DIRECTION (*TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 59-DAY PERIOD DURING JULY 27 THROUGH SEPTEMBER 24, 1970.

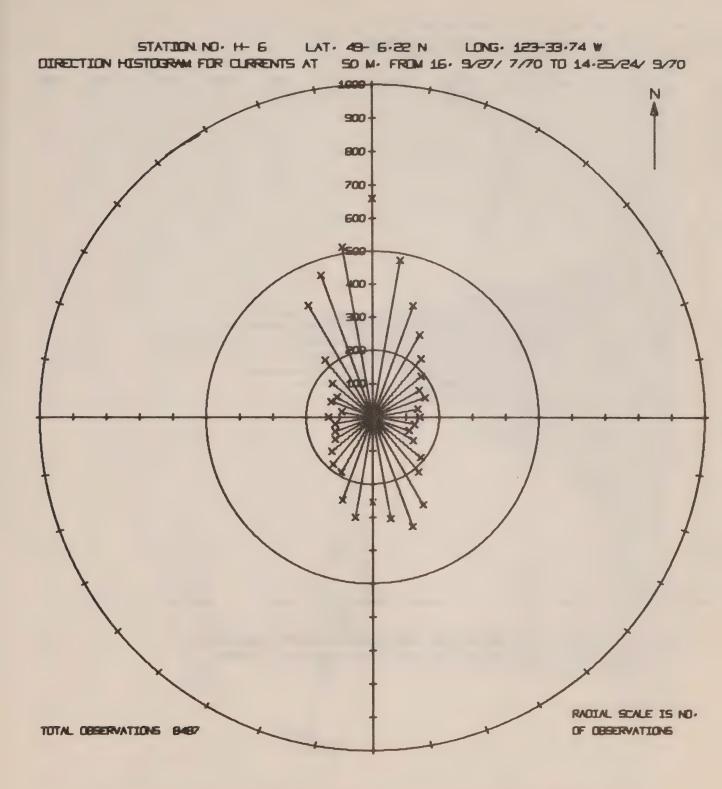


FIG. 16c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 47-DAY PERIOD DURING JULY 27 THROUGH SEPTEMBER 24, 1970.

LONG. 123-33.74 W

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS DESERVATION PERIOD, FROM 16. 9/27/ 7/70 TO 14.25/24/ 9/70 500 200 300 400 600 700 800 900 1000 FREQUENCY O 100 MEAN TEMP. 3.00 NO. 0 PCT. 0 0 3.05 3.10 0 0 0 3.30 3.35 3.40 3.50 0 0 3.55 0 3.60 3.65 3.70 3.80 20 0++ 51 57 3.85 0 3.90 0 131 220 4.00 4.05 257

4.45 644 4.50 568 484 401 4.60 4.65 180 249 4.80 193 4.85 182 4.90 130 4.95 0 ********* 118 5.00 91 5.05 0 * * * * * 5.10 40 0 0 **** 0 0 ** 5.15 0 5.20 0 # 11 0# 11 5.30 0 = 5.35 6 5.45 5.50 0 0 0 5.55 NUMBER OF TEMP. GREATER THAN 5.55 = 0 NUMBER OF DBSERVATIONS = 8487

LAT. 49- 6.22 N

STATION NO. H- 6

4.10

4.20

4.25

4.35

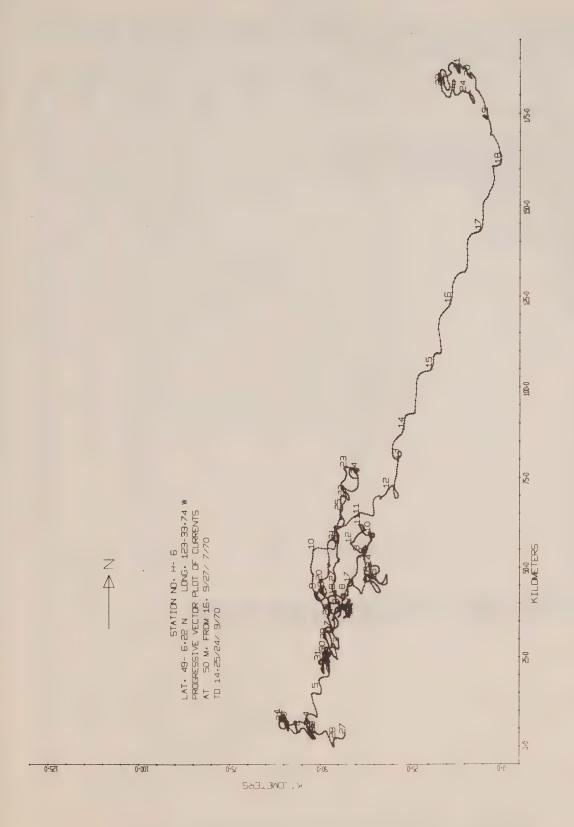
337 588

690 793

586

MEAN TEMP = 4.40 DEG. C.

FIG. 16D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 59-DAY PERIOD DURING JULY 27 THROUGH SEPTEMBER 24, 1970.



A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 59-day period during July 27 through September 24, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

Fig. 16e.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 13.45/16/ 4/69 TO 15.45/22/ 4/69

						0.0	100	100	140	140	100	200
M_AN SPEED		PCT.		40 I	60 I	08 I	100	120 I	140 I	160 I	180	200
0	2)		•	•	•	•	•	•	•	•	
10	42	5	O * * * * * * * * * * * * * * * * * * *	******								•
20	1.7	?)******									
30	35	4	0									
40	59	10	() * * * * * * * * * * * * *				• •					
50 60	74 103	3 12	O * * * * * * * * * * * * * * * * * * *									
73	64	7	0********									
30	66	ಕ	0 *********		********							
30	41	5	0*********	******								
100	39	4	0 *** * * * * * * * * * *									
110	30	3) * * * * * * * * * * * *	**								
120 130	18 52	2	() * * * * * * * * * * * * * * * * * * *									
140	34	6	0*********		•							
150	40	6,	O*********									
160	13	1	0 * * * * * * *									
170	17	2	7******									
130	24	3)**********									
170 2)u	20	1 2	O*****									
210	12	1	2*****									
220	14	2	7*****									
230	2	1	O****C									
241	1)	0*									
250	4		0 * *									
260 270	3	0	0**									
230	3		0**									
230	2	0	9									
300	0	0	2									
310	0	0	2									
320 330	0	0	0									
340	0	0	0									
350	0	Ö	2									
360	0	0	0									
370	0	0	0									
340	0	Ō	0									
390 400	0	0	0									
410	0	0	0									
423	0	ŭ	0									
430	0	0	0									
440	0	0)									
450	1	0	0 *									
NUMBER C	OF SPE	EDS G	REATER THAN 4	50 = 0	NUME	BER OF OBS	ERVATIONS =	= 877	MEA	N SPEED =	93 MM/SEC	

FIG. 17A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 6-DAY PERIOD DURING APRIL 16 THROUGH APRIL 22, 1969.

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 13.45/16/ 4/69 TO 15.45/22/ 4/69

IR.	٧٥.	PCT.		10
5	. 27	دَ 1) ************************************	
10	10	1	0	
15	5	î	0****	
20	16	2)**********	
25	7	1	One one one of the contract of	
30	6	1)*****	
35	13	1	0.4000000000000000000000000000000000000	
40	10	I	0.000000000000	
45 50	7	. 1		
55	15 -	2	Onesenenes	
6)	13	1		
65	12	1)*******	
70	115	2	76484888888888	
	8	1)*****	
80	. 11	. 1	3*********	
35 90	11 22	1 3	() ************************************	
95	24	3	0======================================	
100	27	3	()	
1.05	28	3		
110	15	2	0 *************************************	
110	20	2	3***************	
120	22	3		
125 130	19 9	2	0	
135	12	1	0*************************************	
140	8	1	0*******	
145	6	1	0*****	
15)	5	1	0****	
155	10	1	0*****	
160	5 ,	1	0	
165	6	1	·)*******	
17C 175	12	1		
130	6	1	70000	
195	4	ŏ	0****	
190	6	1	0*****	
195	3	0	3+44	
200	4	0	0***	
205	2	Ü	3**	
210 215	4	0	0***	
220 -	6	1)******	
225 .	3	Ū	2***	
230	7	1	0*****	
235 -	5	1	0****	
240 5	8	1	()******	
245	8	1)********	
250 2 55	8	1	0*************************************	
260	8	1		
265	10	1	0******	
270	7	1)*****	
275	11	1	9********	
280	14	2	3*********	
285	5	1)*****	
290 295	10	1	()************************************	
300	18	2		
305	25			
310	18	2	Axexxxxxxxxxx	
315	24	3	O * * * * * * * * * * * * * * * * * * *	
320	2.7		0 **********************	
325	, 18) = = = = = = = = = = = = = = = = = = =	
330	24		0**************************************	
335 340	23 21	ے 4		
- 10	19			
345	4			
345 350	22	3	0***************	
345 350 3 55	22 12		() ************************************	

FIG. 17B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 6-DAY PERIOD DURING APRIL 16 THROUGH APRIL 22, 1969.

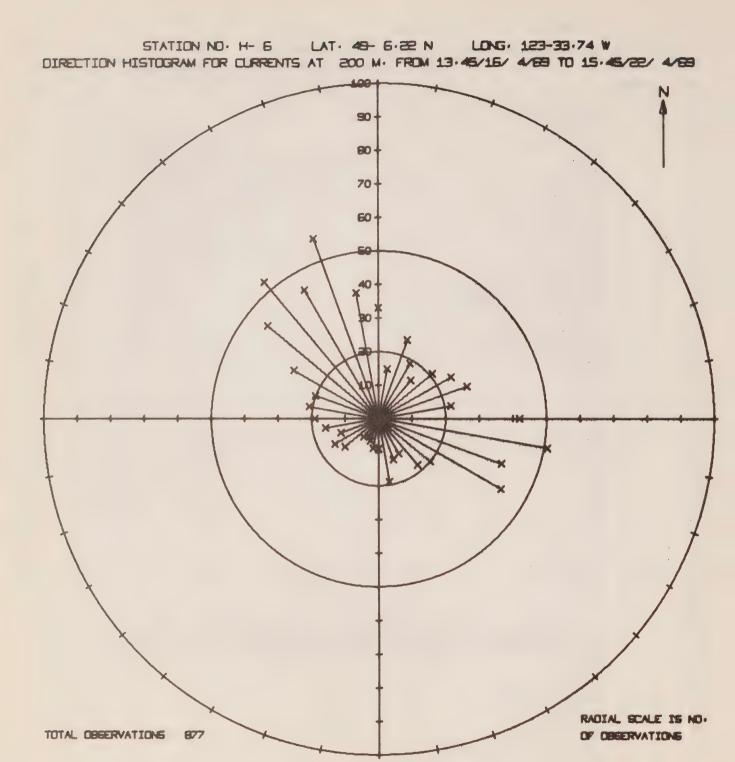


FIG. 17c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 6-DAY PERIOD DURING APRIL 16 THROUGH APRIL 22, 1969.

STATIL V NO. 4- 6 LAT. 49- 6-22 N LUNG. 123-33.74 W

(ISTUDIAM OF TEMPERATURE (DEG. CERT.) AT A DEPTH OF 200 METERS 1.25 RVATIO 1 PERIOD. FROM 13.45/16/ 4/67 TO 15.45/22/ 4/67

1 AV	FREJU				43	60	80	100	120	140	160	180	200
L MP .	NO.				1	I	I	I	I	I	Ĭ	I	I
1010													
7. 15	٦.												
7.10)	7											
7.15	0	2											
7.20	i i	J	1										
7 • 25	1												
7.35	Ö	j											
1.40	, o	s/ u	·										
7.45	j	<u> </u>											
1.50	17,	- 5	0										
7.55	3	2) # #										
1.50	24	5		- W - W									
7.65	36	4	^********	****									
7.70	47	- 7	~~****	****	*******								
1.75	51	- 5		****	*******								
7.40	9.1	5	*********	****	*****								
7.45	106	12		****		******	******	*******					
7.90	133	1.2	**********			*****	********		*				
7.95	124	1+	1/4 * * * * * * * * *						*******				
5.05	101	12				********	*********	******	4				
8.10	68	12	0						•				
0.15	32	4)*******										
8.20	25	3,	(
z.25	2	- 5											
JUMBER	UF TEMP	. GR	CATER THAN	8.25	= 0	NUMBE	R OF OBSER	RVATIONS =	877	MEAN	TEMP = 7	92 DEG. C.	

FIG. 17D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 6-DAY PERIOD DURING APRIL 16 THROUGH APRIL 22, 1969.

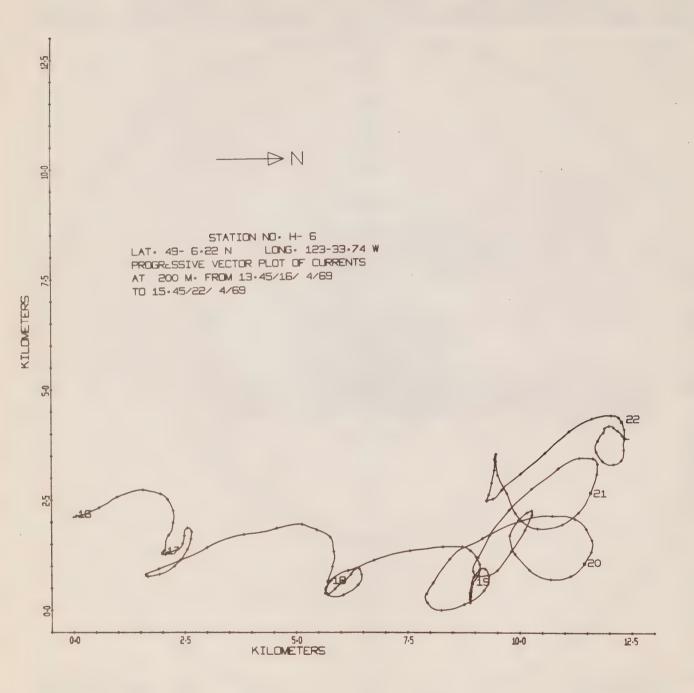


Fig. 17e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 6-day period during April 16 through April 22, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES OBSCRVATION PERIOD, FROM 9. 9/10/ 7/69 TO 16. 9/28/ 8/69

MEAN SPEED	FREQ NQ.	UENCY PCT.		0 200 I I	300	400 1	500 I	600 I	700 I	800	900	100
0	0	0	0									
10	348	5		*********	*********	***						
20	140	2	0 *******									
30	181	3	0 * * * * * * * * *									
40	492	7										
50	430	6		• • • • • • • • • •								
60	713	10	-	*****								
7 0 80	504	7 9					********					
90	668 342	5					**********	********				
100	352	5			*******							
110	388	5		********								
120	242	3										
130	352	5		*********	*********							
140	213	3		*********								
150	305	4		********								
160	189	3	1)*******									
170	153	2	0 * * * * * * * *									
180	207	3	0	*********								
190	124	2	0	***								
200	155	2	0 * * * * * * * *	*****								
210	81	1	0 * * * * * * *									
220	100	1	0 *** *** ***	*								
230	84	1	0******									
240	43	1	0****									
250	66	1	0 * * * * * * *									
260 270	39	1	0****									
280	41 34	0	0***									
290	28	0	0***									
300	12	0	0+									
310	7	o	0*									
320	9	ō	0*									
330	8	ō	0*									
340	5	0	0#									
350	11	0	0*									
360	8	0	0#									
370	6	0	0*									
380	3	0	0									
390	4	0	0									
400	1	0	0									
410	10	0	0*									
420	1	0	0									
430 440	0	0	0									
450	0	0	0									
460	0	0	2									
470	0	0	0									
480	o o	ő	0									
490	0	0	0									
500	0	C	U									
510	0	0	0									
520	0	0	0									
530	0	0	0									
540	0	0	0									
550	0	0	0									
560	0	0	0									
570	0	0	0									
580	1	0	0									
NUMBER	OF SPE	EDS S	REATER THAN	580 = 0	NU	IMBER OF	DBSERVATIONS	= 7100	ME	AN SPEED =	104 MM/S	EC

FIG. 18A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH AUGUST 28, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 9. 9/10/ 7/69 TO 16. 9/28/ 8/69

MEAN	EREO	UENCY	0 50 100 150 . 200 250 300 350 400 450 500
DIR.	NO.	PCT.	
0	138	2	0.0000000000000000000000000000000000000
5	120	2	0 = = = = = = = = = = = = = = = = = = =
10 15	97 92	1	
20	122	2	000000000000000000000000000000000000000
25	79	1	0.0000000000000000000000000000000000000
30	59	1	0 *********
35	58	1	00000000000000
40 45	50 52	1	
50	56	1	000000000000000000000000000000000000000
55	54	1	Ossssessess
60	46	1	000000000000000000000000000000000000000
65	57	1	
70 75	46 54	1	() () () () () () () () () () () () () (
80	69	î	000000000000000000000000000000000000000
85	55	1	0 ** **
90	49	1	000000000000000000000000000000000000000
95 100	75 67	1	
105	75	1	()
110	102	ī	()***************
115	111	2	0 ****************
120	112	2	0
125 130	132	2	() 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
135	144	2	0.0000000000000000000000000000000000000
140	192	3	0
145	197	3	0 0
150	169	2	(35500000000000000000000000000000000000
155 160	149	2 2	() = = = = = = = = = = = = = = = = = = =
165	149	2	0.0000000000000000000000000000000000000
170	101	1	0.0000000000000000000000000000000000000
175	90	1	9**********
180	74	1	(**************************************
185 190	84 55	1	()************************************
195	56	1	()seeseesee
200	51	1	() = = = = = = = = = = = = = = = = = = =
2.05	56	1	0********
210 215	49 48	1	
220	48	1	() = = = = = = = = = = = = = = = = = = =
225	48	ī	0******
230	49	1	():::::::::::::::::::::::::::::::::::::
235	54	1	000000000000000
240 245	39 42	1	() = = = = = = = = = = = = = = = = = = =
250	44	1	0.0000000000000000000000000000000000000
255	48	1	0.000.000
260	56	1	0======================================
265 270	44 54	1	()*********
275	57	1	0========
280	66	1	0********
285	63	1	0*********
290	52		0********
295 300	62 73		()*********
305	92		()*************************************
310	109		0
315	127	2	
320 325	144		() = = = = = = = = = = = = = = = = = = =
330	146 229		
335	276		0**************************************
340	304	4	0
345	378		0
350 355	244		() « « « « » « » « » « » « » » « » « » «
277	157	2	

FIG. 18B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH AUGUST 28, 1969.

STATION NO. H- 5 LAT. 49- 6.22 N LONG. 123-33.74 W
DIRECTION HISTOGRAM FOR CURRENTS AT 200 M. FROM 9. 9/10/7/69 TO 16. 9/28/ 8/69

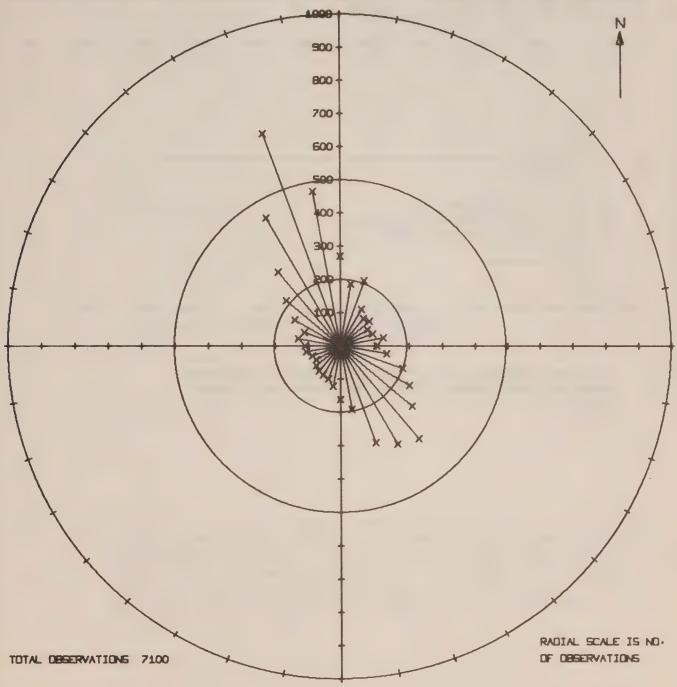


FIG. 18c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH AUGUST 28, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS OBSERVATION PERIOD, FROM 9. 9/10/ 7/69 TO 16. 9/28/ 8/69

MEAN	FREQU	IENCY	0 200	400	600	800	1000	1200	1400	1600	1800	2000
TEMP.	NO.			I	Ĭ	1	1	Ī	1	1	1	1
8.00	0		0				•	•	•	•	•	•
8.05	0	0	0									
8.10	0	0	0									
8.15	0	0	0									
0.20	0	0	0									
8.25	7	0	0									
8.30	46	1	0 **									
8.35	149	2	0 *****									
8.40	43	1	0++									
8.45	307	4	0	F #								
8.50	1511	21	0 *********		*******		*********	*******	********	***		
8.55	342	5	0									
8.60	266	4	O********									
8.65	198	3	0 * * * * * * * * * *									
8.70	414	6	0*****									
8.75	480	7	0									
8.80	711	10	0		*******							
8.85	898	13	0		********							
8.90	714	10	0********									
8.95	264	4	0 *** *** *** ***									
9.00	177	2	0									
9.05	381	5	0 *** * * * * * * * * * * * * * * * * *									
9.10	133	2	0******									
9.15	39	1	0**									
9.20	20	0	0*									
NUMBER	OF TEMP	• GRI	EATER THAN 9.2) = 0	NUMBE	R OF OBSE	RVATIONS =	7100	MEAN	TEMP = 8	.72 DEG. C	•

FIG. 18D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH AUGUST 28, 1969.



Fig. 18e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 49-day period during July 10 through August 28, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES DESCRIVATION PERIOD, FROM 18.29/28/ 8/69 TO 15.29/18/ 9/69

McAN	FREQU	UENCY	0 50	100	150	200	250	300	350	400	450	500
SPEED	NO.	PCT.		1	1	1	I	I	I	I	I	I
0	0	0	0									•
10	202	7	() * * * * * * * * * * * * * * * * * * *			******						1
٦,	ο 7											
30	76	3	0	* *								
40	205	7	0 *** *** * * * * * * * * *		********	******						
50	216	7	0 * * * * * * * * * * * * *	*********		********						
60	325	11	0 *** *** * * * * * * * * * * * * * * *		********	********		*******	•			
70	220	7	0*****		********	********						
* 5	277	9	0 * * * * * * * * * * * * * * * * * * *	********		******	*********	**				
17	157	5	0 * * * * * * * * * * * * * * * * * * *	*********	******							
100	142	5	0 * * * * * * * * * * * * * * * * * * *									
110	197	7	0 ******	*********	********	*****						
120	98	3	0*********	*****								
130	141	5	0******		****							
140	99	3	0 **********									
150	102	3	0 **********									
160	72	2	0******									
170	65	2	0******									
180	110	4	0******	*******								
190	57	2	0*******									
200	67	2	0 **********									
210	34	1	J******									
220	42	-	() * * * * * * * * * * * * * * * * * * *									
230	14	0	0***									
240	11	0	0**									
250	3		. * *									
260	.)		^									
270	0		0									
230	2	0										
290	0	0										
300	1	0	:)									
NUMBER	OF SPE	EDS G	REATER THAN 3	00 = 0	NUM	BER OF OBS	ERVATIONS :	= 3007	MEA	N SPEED =	94 MM/SE	С

FIG. 19A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 18.29/28/ 8/69 TO 15.29/18/ 9/69

1	MEAN DIR.	FREQUENO.	UENCY PCT.		0 60	80	100 I	120 140	160	180	200
10				() * * * * * * * * * * * * * * * * * * *	******	•		1 1	1	1	1
10											
20			-		**						
25					***						
15											
40	30	29	1	0 * * * * * * * * * * * * * * *							
45 19 1 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1											
So											
55											
10											
70											
77											
30											
90											
190			_								
100 44 1 0											
105 42 1 0 115 13 12 12 13 14 15 15 15 15 15 15 15											
115											
120											
120 63 2 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						********					
130						******					
135 50 2 0 145 58 2 0 155 55 2 0 155 43 1 0 160 35 1 0 175 37 1 0 176 37 1 0 177 27 1 0 178 27 1 0 188 2 1 0 188 2 1 0 189 2 1 0 180 2 1 0 180 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2						**					
145			2	· · · · · · · · · · · · · · · · · · ·	*****						
150 55 2 0						**					
155											
160											
173											
175			_								
130 22											
145											
170											
200		19	1								
215											
210 9 0 0											
220											
225											
230											
235											
245											
250 9 0 0 ***** 255 16 1 0 ******** 260 18 1 0 ******** 265 14 0 0 ******** 270 22 1 0 *******************************			1								
255											
260											
270											
275											
280											
285				*							
295											
300	290	31	1	*****							
305 34 1 0***********************************											
310											
315					****						
325 85 3 0***********************************			1								
330 108 4 0**********************************											
335 150 5 0											
340 143 5 0***********************************									***		
350 122 4 0**********************************	340	143									
									**		
J)J J7 & (***********************************								******			
	277	27	2								

FIG. 19B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W
DIRECTION HISTOGRAM FOR CLRRENTS AT 200 M. FROM 18.29/28/ 8/69 TO 15.29/18/ 9/69

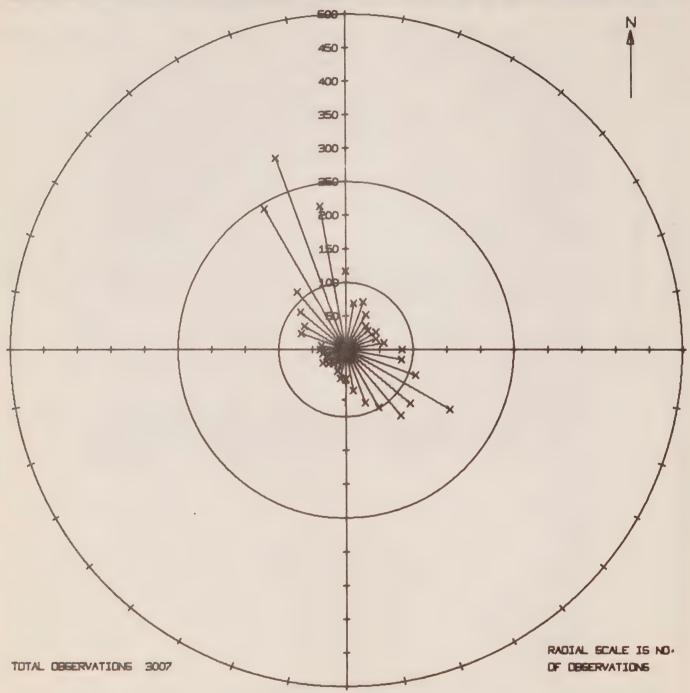


FIG. 19c. A HISTOGRAM OF DIRECTION (°C) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS DESCRIVATION PERIOD, FROM 18.29/28/ 8/69 TO 15.29/18/ 9/69

MIAN	FREDU	ENCY	0	200	400	600	900	1000	1200	1400	1600	1800	2000
TLMP.		PCT.		1	1	ī	1	1	ī	1	1	1	
0.00	0	ũ	0			·	•	•	-	•	•	•	•
3:05	0	0	0										
4.10	0	O	С										
5.15	0	0	2										
4.20	2	С	3										
7.25	0	0	0										
F.30	0	0	C										
8.35	0	0	0										
n.40	0	0	2										
0.45	0	0	7										
0.50	0	0	Û										
:.55	0	0	0					1					
5.60	0	0)										
0.65	0)	7										
9.70	Э	C	0										
4.75	0	Ü	0										
o • 80	0	0	0										
8.85	0	0	0 .										
3.90	0	Ç	()										
8.95	10	0	0*										
9.00	58	2	7***										
9.05	739	25	0 * * * * *	********		******	***						
7.10	1774	59	0****			*******	********	*********		********	******	*****	
9.15	371	12	0****										
7.20	35	2)***										
MIMBEO	DE TEMO	Co	CATED T	THAN 9 20	= 0	NITIMB	ED DE ORS	PVATIONS :	3007	MEAN	TEMP - 0	0 00 000 0	

NUMBER OF TEMP. GREATER THAN 9.20 = 0

NUMBER OF OBSERVATIONS = 3007

MEAN TEMP = 9.09 DEG. C.

FIG. 19D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

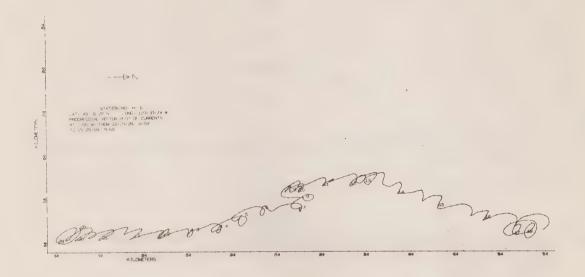


Fig. 19e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 21-day period during August 28 through September 18, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES OBSERVATION PERIOD, FROM 17.59/18/ 9/69 TO 12.31/16/10/69

MEAN SPEED	FREQ NO.	UENCY PCT.		100	150 ·	200	250 I	300 I	350 I	400	450	500
0)	0	0				•	•	•	*	1	
10	187	5	· () * * * * * * * * * * * * * * * * * *	******		**						
20	61	2	0********									
30	81	5	0	*								
40	229	6		*****	*******	******	****					
50 60	202 393	5 10	(*********	*******	****						
70	281	7	0 ***********				**********			*****		
30	363	9	()**********	**********				********				
90	250	6	7**********	*********		******	******					
170	227	6	1) * * * * * * * * * * * * * * * * * * *	********			* * *					
110	275	7		*******			*********					
120	158	4	J	********	*****							
130	231	6	0*********	*********	• • • • • • • • •	*****	****					
140	136	3	() * * * * * * * * * * * * * * * * * * *	*********	•							
150 160	197	5	0		******	****						
170	86	2	0									
180	103	3	0									
190	71	2	0**********									
200	65	2	()									
210	54	3	0 * * * * * * * * * *									
220	04	4	******									
230	36	1	0*****									
240	22		0***									
250	44	1	0*****									
260 270	18		()****									
280	10	1 0	7**									
290	10	0	0**									
300	1	0)									
310	3	ō	?*									
320	4	0	0*									
330	2	0	0									
340	4	0	0*									
350	4	0	0*									
NUMBER	OF SPE	CD S G	REATER THAN 350	= 0	NUMBE	R OF OB	SERVATIONS =	4000	MEAR	SPEED =	104 MM/SEC	

FIG. 20A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DESCRIVATION PERIOD, FROM 17.59/18/ 9/69 TO 12.31/16/10/69

MEAN		UENCY	
DIR.	NU.	PCT.	U
5	79		0
10 15	68 49	2	Овес с с с с с с с с с с с с с с с с с с
20	66		7
25	43	1	
3 C 3 5	38 25	1	
40	30	1	000000000000000000000000000000000000000
45 50	39 28	1	
55	34	1	/ ** ** ** ** ** ** ** ** ** ** ** ** **
60	24	1	0 * * * * * * * * * * * * * * * * * * *
65 7 0	24 18	1 0	
75	24	1	0.0000000000000000000000000000000000000
80	35	1	0***********
85 90	38 41	1	Офинанський применения () при
35	37	1	() = = = = = = = = = = = = = = = = = = =
100	46 45	1	
110	58	1	0.0000000000000000000000000000000000000
115	62	2	0
120 125	66 70	2	Oncorrection on the state of th
130	58	1	0
135	65	2	<u> </u>
140 145	74 72	2	
15)	65	2)
155	64	2	<u>(</u> ************************************
160 165	42 61	1 2	
170	74	2	9
175	/3	2	0
180 185	64 55	2	
190	58	1	0.0000000000000000000000000000000000000
195 200	49 61	1 2	
205	38	1	0
210	38	1	<u>O</u> **********
215 220	42 31	1	Oneneeeeeeeeeee
225	36	î	0.0000000000000000
230	33	1	9*********
235 240	28 21	1	O+++++++
245	37	1	0======================================
250 255	23 33	1	
260	44	1	0
265	53	1	0
270 275	31 36	1	() ************************************
280	34	î	000000000000000000000000000000000000000
285	26	1	0*****
290 295	40		Onnessananananananananananananananananana
300	47		0======================================
305 310	58 50	1	0 *********************
315	59		
320	83	2	0 ******************************
325 330	102		0 *************************************
335	129)*************************************
340	169	4	0
345 350	147	4	Onenconconconconconconconconconconconconcon
355	134	3	1 ************************************

FIG. 20B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

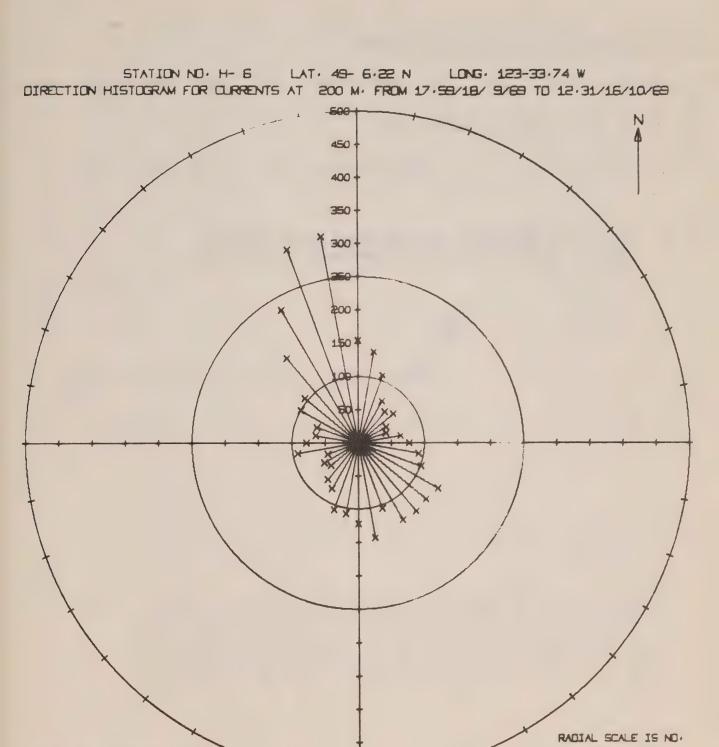


FIG. 20c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPT-EMBER 18 THROUGH OCTOBER 16, 1969.

TOTAL DESERVATIONS 4000

OF DESERVATIONS

HISTOGRAM UF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS DESERVATION PERIOD, FROM 17.59/18/ 9/69 TO 12.31/16/10/69

MEAN TEMP. 9.00 9.05 9.10		PCT. 0	I 0	500 I	1000 I	1500 I	200	0 2500 I I	3000	3500 I	4000 I	4500 I	5000 I /
9.15 9.20 9.25	2042	51 27 0	0 *****	* * * * * * *	******			** OBSERVATIONS =	≈ 4 000	MEAN	TEMP ≈	9.15 DEG.	C.

FIG. 20D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

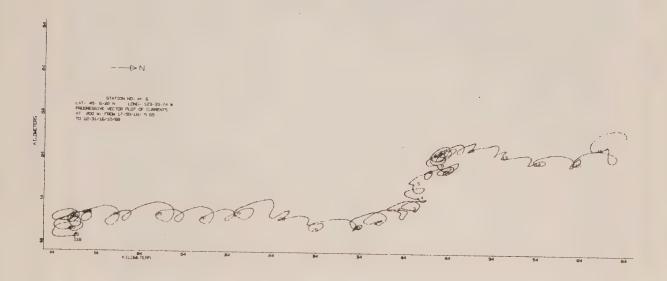


Fig. 20e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 28-day period during September 18 through October 16, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED [MM/SEC] FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PORIOU, FROM 15.51/16/10/69 TO 12.22/25/11/69

MEAN SPEED O	FRE 31	PCT.		1 CCS	300 I	400 I	500 I	1 600	700 I	800 I	900 I	1000 I			
10	390	7	7 * * * * * * * * * * * *												
2.0	140	2	-	*											
30	141	2)												
40	318	6		********	*******										
5.3	327	6	0	********											
60	587	10	0 * * * * * * * * * * * *				• • • • • • • • • •								
70	410	7	0 * * * * * * * * * * * * *												
80	494	9	0 * * * * * * * * * * * *												
90	324	6	0 * * * * * * * * * * * * *												
100	286	5	O * * * * * * * * * * * * * * * * * * *	*****	***										
110	378	7	0******	*******	*******	****									
120	191	3	0 ** * * * * * * * * * * * *	****											
130	263	5	0*******		***										
140	145	3	1)*********												
150	187	3	0*********												
160	137	2	0												
170	135	2)******												
130 190	104	3													
200	125	2													
210	61	1	0*****												
220	69	1	0****												
230	41	1	0****												
240	35	î	0****												
250	32	î	0***												
260	34	1	0***												
270	53	ī	0 * * * * *												
280	29	1	0***												
290	40	1	() * * * *												
300	20	0	0**												
310	13	0	0#												
320	22	0	O #-#												
330	13	0	0 *												
340	15		() # #												
350	4		0												
360	8	0	0+												
NUMBER (OF SPE	EDS GF	REATER THAN 3	60 = 0	NUM	BER OF OBS	ERVATIONS :	* 5740	MEAN	N SPEED =	103 MM/S	EC			

FIG. 21A. A HISTOGRAM OF SPEED (CM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPT - 1F 200 METRES 16 SERVATION PERIOD, FROM 15.51/16/10/69 TO 12.22/25/11/69

MASH	FREQUE			150	200	250	300	350	400	450	500
DIR.			1 I I	1	I	1	I	ī	I	ī	I
U	103	2									
5 1 J	88 71	2)*************************************								
15	65	1	0*******								
20	97	2	O*******								
25	45	1									
30	49	1	0								
35	30	1	O*****								
40	2.7	0	1++++								
45 50	32	1	0								
55	39 31	1	0******								
60	35	1	0*****								
65	47	ī	1)******								
70	39	1	0*****								
75	40	1	0 ******								
80	42	1	0								
85 9 0	61 49	1	() * * * * * * * * * * * * * * * * * * *								
95	43	1	() *******								
100	22	1	() *****								
195	60	1	() * * * * * * * * * * * *								
110	49	1	j********								
115	82	1	0								
120	99	2	^**************								
125 130	108	2									
135	124	2									
140	136	2) ************	****							
145	132	2		***							
150	101	2	O*********								
155	112	2	?********								
160	83	1	7*********								
165 170	81	2	() * * * * * * * * * * * * * * * * * * *								
175	87 83	1	0 ********								
180	74	ī	0								
185	62	1	0								
190	69	1) * * * * * * * * * * * * * * * * * * *								
195	49	1	0*******								
200	55	1	0								
205 210	60 46	1	O * * * * * * * * * * * * * * * * * * *								
215	65	1	7*********								
220	76	1) *********								
225	21	1	^*******								
230	49	1	0								
235	43	1	0*****								
240 245	51 59	1)********* G*********								
250	52	1)*****								
255	49	1	0*****								
260	57	1	•) • • • • • • • • • • • •								
265	78	1	Ö								
270	52	1	0								
275 280	48 48	1) * * * * * * * * * * * * * * * * * * *								
285	53	1	0								
290	48	ī) * * * * * * * * * * * * * * * * * * *								
295	57	1	0								
300	58	1	O********								
305	83	1	0								
310 315 °	68 103	1	O***********								
320	155	2	1) * * * * * * * * * * * * * * * * * * *								
325	184	3	0		***						
330	221	4	0			**					
335	201	4	0 ******								
340	237	4)*************************************								
345	216	4									
350 355	207 164	4	() * * * * * * * * * * * * * * * * * * *								
,,,,	104	,									

NUMBER OF OBSERVATIONS = 5740

FIG. 21B. A HISTOGRAM OF DIRECTION (*TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W
DIRECTION HISTOGRAM FOR CLRRENTS AT 200 M. FROM 15.51/16/10/69 TO 12.22/25/11/69

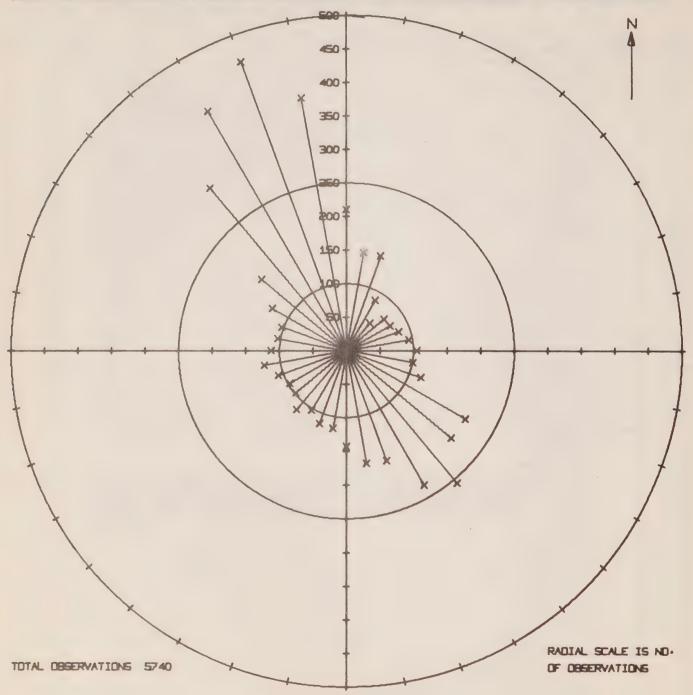


FIG. 21c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS DESERVATION PERIOD, FROM 15.51/16/10/69 TO 12.22/25/11/69

1007 19	500 2003 I I	2500 I	3000	1	4000 I	4500 I	50
						•	
					,		
* * * * * * * * * * * * * * * * * * * *	**********		********				
***********	***						
	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·	t	(

FIG. 21D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

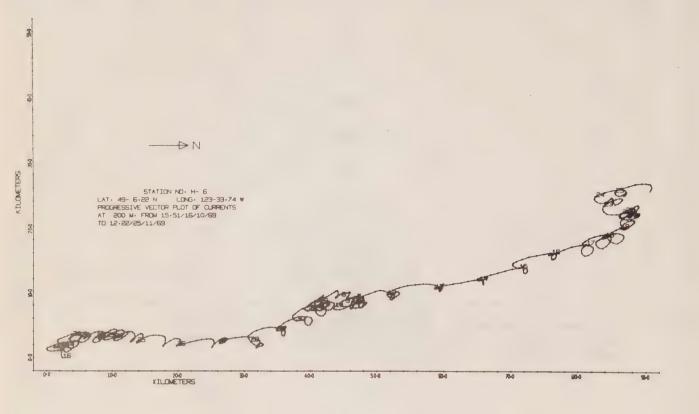


Fig. 21e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 40-day period during October 16 through November 25, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES UBSERVATION PERIOD, FROM 16.42/25/11/69 TO 9.33/14/ 1/70

MEAN .	FREQUEN		100	200	300	400	500	600	700	800	900	1000
SPEED	NO. 1 PC	C 0	1	1	I	I	I	I	I	1	I	1
10	495	7 0*	*********			*******						
20	151	2 0*		* *								
30	180	3)*										
40		6 04	*********			*****						
50	356	5 0*	*********			***						
60	653	9 0*	*********			*******		******	• •			
70	429	6 (*	********			********						
80	581	8 0#	*****			*****		****				
90	389	5 0*	*******			*****						
100	317	4 0*	******	*******	******							
110	452	6 0*	*********		*******	*******	* *					
120	288	4 0 *		********	*****							
130	389	5 0*		********	********	*****						
140	242	-	**********	*******	•							
150	265	4 0*		• • • • • • • • • •	****							
160	185	3 0*		*****								
170	147		*********									
180	219	-	*********	******								
190	123	-	*********									
200	154 39	_		* *								
210 220	146		******									
230	83	_	*****	* *								
240	73		*****									
250	100		******									
260	64		****									
270	55	_	****									
280	29		**									
290	44		***									
300	21	0 0	*									
310	17	0 0	**									
320	8	0 0+	•									
330	3	0 0										
340	3	0 0										
350	2	0 0										
360	1	0)										
NUMBER (DF SPEEDS	S GRE	TER THAN 3	60 = 0	NUM	BER OF OBS	ERVATIONS	= 7158	MEA	N SPEED =	107 MM/S	EC

FIG. 22A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 50-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 14, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DESCRIVATION PURION, 2004 16.47/25/11/60 TO 9.33/14/ 1/70

				<i>a</i> 0				250	200	250			
DIO.	FREDUEN NO. PI	VSY Lla		50 1	100	150 I	200 I	250 I	300 I	350 I	40 0	450 I	500
0	164						-				·	·	•
5	128	_				• • •							
10 15	103	_		******									
20	118				*******	a							
25	80		0	*****	* *								
30	68	1		******									
35 40	62 56		O * * * * * *										
45	43		0 * * * * * *										
50	44		0 * * * * * *										
55	38		0 * * * * * *										
60	42		0 * * * * * *										
65 70	61 59	1	0 * * * * * *										
75	51	î											
80	34	0] * * * * * *										
85	55	1	0*****										
90 95	45 41	1	0 *****										
100	54	1	()*****										
105	56	1	() * * * * * *										
110	65	1											
115 120	78	1											
125	81 80	1											
130	82	1											
135	88	1		*****									
140	119	2			******								
145 150	148	2	-		********								
155	155	2											
160	163	2	0****		******	********							
165	117	2			******								
170 175	150	2			*********								
180	163	2											
185	156	?											
190	133	2			******								
195	119	2			*******	*							
200 205	107 97	1											
210	100	1		******									
215	78	1	0 * * * * *		**								
220	70	1		******									
225	101	1											
235	64	-		*****									
240	68	1	0 * * * * *										
245	51	1	0 * * * * * *										
250 255	60 68	1	0 * * * * * *	· • • • • • • •									
260	62	1	0 * * * * *										
265	81	1		******									
270	68	1											
275 280	62 67	1	0 * * * * * *	******									
285	62	1	0 * * * * *										
290	74	1	() * * * * * *	******									
295	96	_		*******									
300 305	104 94		-										
310	104												
315	114	2	0 ****	*****	*******								
320	171					*********							
325 330	177					* * * * * * * * * * * *							
335	211												
340	216					********							
345	226					********		1-16					
350	188				********	*********							
355	150	2	U = = = = = = = = = = = = = = = = = = =	******									

NUMBER OF UBSERVATIONS = 7158

FIG. 22b. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 50-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 14, 1970.

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W
DIRECTION HISTOGRAM FOR CURRENTS AT 200 M. FROM 16.42/25/11/69 TO 9.93/14/ 1/70

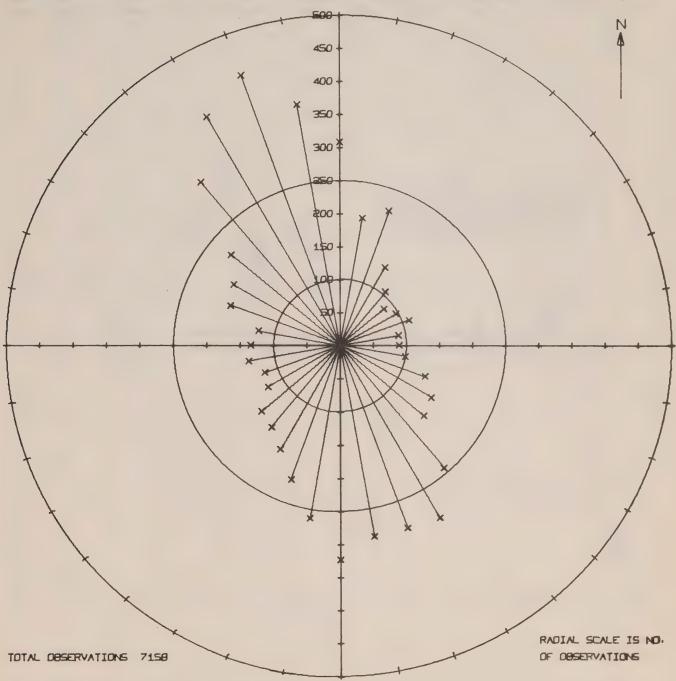


FIG. 22c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 50-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 14, 1970.

MISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS IBSERVATION PERIOD, FROM 16.42/25/11/69 TO 9.33/14/ 1/70

MEAN	FREQU			1000	1500	2000	2500	3000	3500	4000	4500	5000
TEMP .	NO.	PCT.	I	I	1	I	I	I	I	I	I	1
٠.00	0	0	0									
5.75	0	0)									
8.10	n)	0									
8.15	0	0	0									
3.20	2	0	O.									
3.25	0	0)									
5.30	G)	U									
0.35	0	0)									
8.40	0	0	•)									
8.45	0	0)									
d.50	0	0	Ú									
₹.55	0	U,	0									
8.60	0	C.										
8.65	0	U	0									
8.70	0	0	0									
8.75)	0	0									
9.90	0	2)									
8.85	5	3	0									
8.90	50	1	O#									
8.95	716	10	() * * * * * * * * * * * * * * * * * * *	**								
3.00	1626	23	()*******	*********	********							
9.75	12 J2	17	9********		*							
7.10	31/5	44	7*********			********	*********	********				
9.15	379	5) * * * * * * * *									
9.20	4)	0									
7.25	1	0	0									
IUMBER	UF TEMP	. GR	EATER THAN 9.	25 = 0	NUMB	ER OF OBSI	ERVATIONS =	7158	MEAN	TEMP = 9	.06 DEG. C	

FIG. 22D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 50-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 14, 1970.

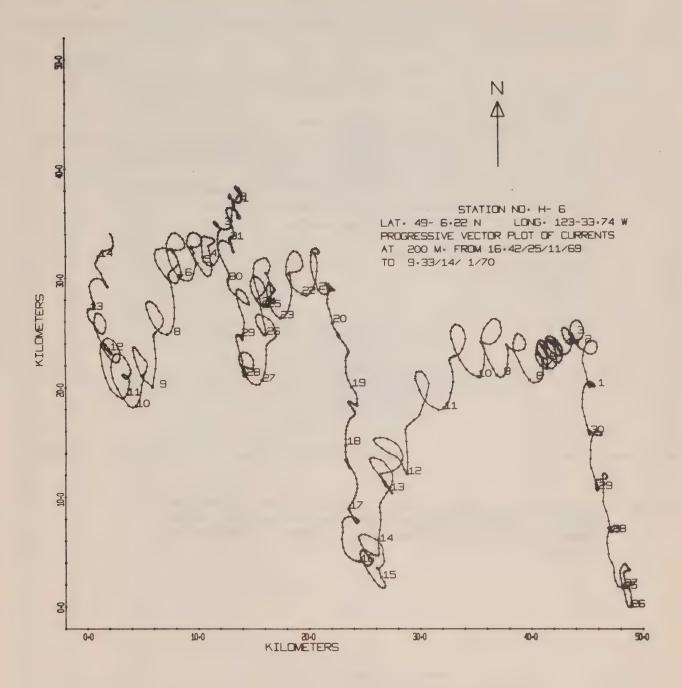


Fig. 22e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 50-day period during November 25, 1969 through January 14, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

STATI : 40. 0- 6 LAT. 49- 6.22 N LONG. 123-35.74

1.1.// (... */SEC) FOR CURRENTS AT A DEPTH OF 200 NETWES ... VALUE P. RICO, FROM 12.5 /1+/ 1/70 (0. 9.28/_)/ 2/70

A. 47	FR:)u	IL VOY	0 50	100	. 50	200	250	300	350	400	450	500
√P 1	Vid.			1	1	I	I	I	1	I	1	I
0 .	0		0									
10	269	5					*********	•				
3.0	89	2) * * * * * * * * * * * * * * * * * * *	0 2 0 0 0 0 0								
30	137	3		*********	***							
40	258	5	()	**********	********		*******					
50	227	4) * * * * * * * * * * * * * * * * * * *			********	**					
60	483		1)		******				*********			
70 50	374	7	7********							••		
90	3.33		000000000000000000000000000000000000000									
100	239	6	*********	*								
110	417	ĝ	0 * * * * * * * * * * * *				*********					
120	236	5)******			*********	****					
130	306	6	1)	********		********	********					
140	202	4	() * * * * * * * * * * *		*******							
150	258	5	0 ********		*******		*******					
160	150	3	0 * * * * * * * * * * *	**********	*******							
170	110	2	0******	*********								
180	175	3	7 ********	*********								
190	67	2	· · · · · · · · · · · · · · · · · · ·	****								
200	86	4	0 ********	***								
210	39	1	0*****									
220	54	1	0+>+++++									
230	23	0										
240	21	0	0####									
250	33	1	0*****									
260	18	0										
270	12	3										
280	7		0.*									
300	7	ĵ)* O									
310	0	j	2									
320	3		0*									
330	0	C										
340	1	0										
350	0	3	7									
350	ĭ	j	0									
370	î	5)									
NUMBER	OF SPEE	DS 3	REATER THAN	370 = 0	NUM	BER OF OBS	ERVATIONS =	5164	MEA	N SPEED #	101 MM/S	SEC

FIG. 23A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 36-DAY PERIOD DURING JANUARY 14 THROUGH FEBRUARY 19, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES OBSERVATION PERIOD, FROM 12.55/14/ 1/70 TO 9.28/19/ 2/70

MEAN	EDECHENCY	0 20 40 42 1 00 100 100 100
	FREQUENCY	
DIR.	NO. PCT.	
5	79 · 2	9*************************************
10	47 1	0***************
15	60 1	^************************
20	49 1	(10050000000000000000000000000000000000
25	63 1	
30	49 1) ********************
35	48 1	9 *****************
140	44 1	0 ***************
45	28 1	()************************************
50	38 / 1)************
55	30 / 1	0********
60	43 1)*************
65	42 I	J * * * * * * * * * * * * * * * * * * *
70	41 1	0 **************
75	43 1	
80 .	. 55 1) *****************
55	71 1	0 ***********************
90 . /	61 1)************************
95	51 1	0.0000000000000000000000000000000000000
100	80 2	0,0000000000000000000000000000000000000
195	ol 1	()*********************
113	55 1	()*******************
1.15	61 1)******************
120	62 1) = = = = = = = = = = = = = = = = = = =
125	65 1	A ************************************
130	82 2	(******************************
135	104 2) ***********************************
140	96 2) ************************************
145	81 2	() ************************************
150	98 2	
155	150 3	0 *************************************
160	137 3) *************************************
165	114 2	0
170	97 2	()*************************************
175	116 2	0+40+40+40+40+40+40+40+40+40+40+40+40+40
180	114 2	()*************************************
185	73 1	700000000000000000000000000000000000000
190	54 1	() **********************
195	73 1	0****************************
200	61 1	() ************************
295	64 1	() ****************************
210	47 1)****************
215.	63 1)***********************
220	45 . 1	()*************************************
225	32 1	0***************
230 .	41 1	0**************************************
		0**************************************
235	47 1	
240	40 1	0 40 40 40 40 40 40 40 40 40 40 40 40 40
245	47 1	0 *************************************
250	50 1	0 *************************************
255	52 1	0 *************************************
260	54 1	0 *************************************
265	56 1	0 *************************************
270	64 1	0 *****************************
275	50 1	() 388 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
280	35 1	0 ***********
285	42 1	0**************
290	44 1	0 **************
295	58 1	() ***********************
300	57 1	0 *********************
305	92 2	
310	82 2	0*****************************
315	113 2	3**************************************
320	106 2	
325		0.0000000000000000000000000000000000000
330		() ************************************
335		J. + + + + + + + + + + + + + + + + + + +
340		0 *************************************
345	125 2	0 * * * * * * * * * * * * * * * * * * *
350	121 2	0
355	107 2	9*************************************

NUMBER OF OBSERVATIONS = 5164

FIG. 23B. A HISTOGRAM OF DIRECTION (*TRUE), WITH CLASS INTERVAL OF 5° FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 36-DAY PERIOD DURING JANUARY 14 THROUGH FEBRUARY 19, 1970.

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W
DIRECTION HISTOGRAM FOR CLIRRENTS AT 200 M. FROM 12.55/14/ 1/70 TO 9.28/19/ 2/70

N
450

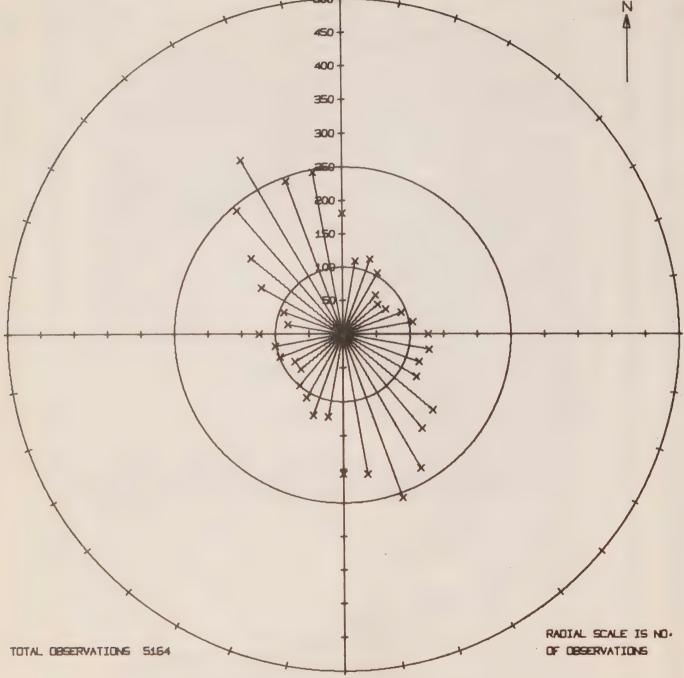


FIG. 23c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 36-DAY PERIOD DURING JANUARY 14 THROUGH FEBRUARY 19, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS OBSERVATION PERIOD, FROM 12.55/14/ 1/70 TO 9.28/19/ 2/70

MCAN	FREQU	ENCY	200	403	600	900	1000	1200	1400	1600	1800	200
T MP.	NO.	PCT.	I	I	I	I	I	1	1	Ī	1	200
8.00	0	0	0						•	•	•	
8.05	0	0	0									
.10	0	0	0									
~.15	0	0	0									
8.20	0	0	0									
8.25	0	0	J									
30	9	J	0									
b.35	0	0	n									
5.40	0	0	0									
3.45	0	0	0									
8.50	0	Q	0									
8.55	2	J	0									
8.60	20	0	0*									
d.55	94	2	0****									
₹.70	202	4	0 ********									
8.75	419	8	0+++++++++	*******								
8.90	533	10	0	*********								
8.85	579	11	0 *** *** *** ***	*********	*****							
8.90	857	17	0 **********	*********	********							
8.95	1536	30	0*********	*********	********	********		********	*******	****		
9.00	874	17	0*********	********	********	********	•					
9.05	48	1	0**									
NUMBER	OF TEMP	• GR	EATER THAN 9.	05 ≠ 0	/ NUMB	ER OF OPSE	RVATIONS =	5164 .	MEAN	TEMP = 8	.89 DEG. 0	

FIG. 23D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 36-DAY PERIOD DURING JANUARY 14 THROUGH FEBRUARY 19, 1970.

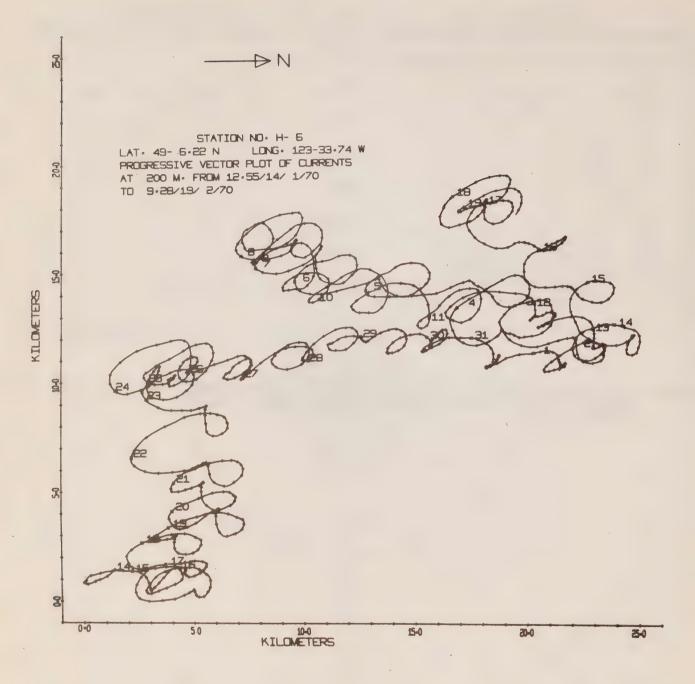


Fig. 23e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 36-day period during January 14 through February 19, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 11.51/19/ 2/70 TO 13.58/25/ 3/70

MEAN		UENCY		100	200	300	400	500	600	700	800	900	1000
SPEED				I	I	1	Ĭ	I	I	1	1	I	. 1
0	. 0	0	0										
10		. 3	·) • • • • • • •		•								
20	95	2	0 ******	* * *									
30	119	2	0 *****										
40	201	6	0 * * * * * *		******	****							
50	285	6	()*****		*****	*****							
60	524	11	0 ******		******	• • • • • • • • •	********	******					
70	353	7	0 * * * * * * *		******		**						
80	518	11) * * * * * * *		*****		********	******					
90	329	7	0 *****		******								
100	302	6	0	******	*******	*****							
110	377	8	0++++++		******	*******	****						
120	245	5	0*****		******	* *							
130	336	7	0 *****		******	• • • • • • • • • •	*						
140	161	3	0*****										
150	196	4) ** * * * *	******	****								
160	90	2	0 *****	* *					•				
170	91	2	0 *****	* *									
180	113	2	0 *****										
190	64	1	0 * * * * * *										
200	79	2	0										
210	34	1	() * * *										
220	45	1) * * * * *										
230	30	1	7444										
240	16	0	() # #										
250	23	0	0**										
260	17	0	0**										
270	18	0	0 * *										
280	7	0	0 =										
290	4	0	2										
300	4	0	2										
NUMBER	UF SPE	EDS G	REATER TH	AN 300	= 0	NUM	BER OF OBS	ERVATIONS =	= 4909	MEAI	N SPEED =	98 MM/S	EC

FIG. 24A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTUGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 11.51/19/ 2/70 TO 13.58/25/ 3/70

MEAN	FRE JULI	N.C.V	20	40	60	80	100	120	140	160	180	20
DIR.		OT.		1	1	. 1	I	I	1	I	1	-
0	95	2					*****					
5	79	2										
10	65 .	1	j************									
15	68	1) * * * * * * * * * * * * * * * * * * *									
20 25	85 53	2					•					
30	. 61	1	~****									
35	54	1	n=====================================									
40	52	1	***********		• •							
45	41	1) * * * * * * * * * * * * * * * * * * *									
50	60	1) * * * * * * * * * * * * * * * * * * *		*****							
55	43	1	Nessesses									
60	57	1										
65 7 0	61 68	1	1									
75	78	2	0 *********									
80	79	2) ************									
85	90	2	0 * * * * * * * * * * * * * * * * * * *									
20	90	2)************				***					
95	73	1)**********									
100	103	2	\\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \									
105 110	81 85	2	O									
115	74	2	.)**********				•					
120	61	2)********									
125	35	2	***********				*****					
130	96	2	()**********		*****							
135	87	2	``**************									
140	106	2	() * * * * * * * * * * * * * * * * * * *				*********					
145	79	2	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~									
150	75 64	2	.) * * * * * * * * * * * * * * * * * * *									
155 160	67	1	O*********									
165	07	1	A*********									
170	59	1										
175	65	1) * * * * * * * * * * * * * * * * * * *			•						
190	62	1	.) * * * * * * * * * * * * * * *									
195	49	1)***********		*							
190	46	1										
195 200	43	i	**************************************									
205	33 42	1	0									
210	44	1	^*********									
215	36	1	·									
220	3.0	1	.)**********	•								
225	37	1	.) * * * * * * * * * * * * * * * * * * *									
230	21	0										
235	27	1) **********									
246 245	31 39	1	O**********									
250	35	1	0 *** *** * * * * * * * * * * * * * * *									
255	39	1	0 *** * * * * * * * * * * * * * * * * *									
260	3.5	1	0 ***********									
265	37	1	0 * * * * * * * * * * * * * * *									
270	35	1	3**********									
275	40	1										
280 285	35 47	1	() ***********									
290	41	1	()									
295		1)*********									
300	46	1	0 *** * * * * * * * * * * * * * * * * *									
305	39	_	O**********									
310	51) *********									
315	97		G * * * * * * * * * * * * * * * * * * *									
320	137)**********									
325 330	135	_)*************************************									
335	181) ** * * * * * * * * * * * * * * * * *									
340	156)*****									
345	145		0 **********									
350	114)**********									
355	102	2	~*******		******	*******	********					

NUMBER OF OBSERVATIONS = 4909

FIG. 24B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970.

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W
DIRECTION HISTOGRAM FOR CURRENTS AT 200 M. FROM 11.51/19/ 2/70 TO 13.58/25/ 3/70

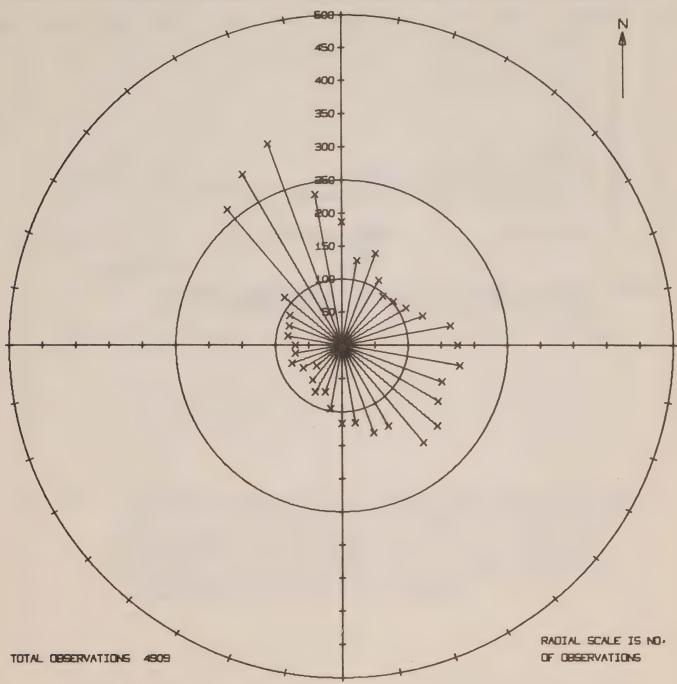


FIG. 24c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS OBSERVATION PERIOD, FROM 11.51/19/ 2/70 TO 13.58/25/ 3/70

MEAN	FREQU	UENCY	0 200	400	600	800	1000	1200	1400	1600	1800	2000
TEMP.		PCT.		ī	1	1	1	1	1	, , , ,	1	2,000
8.00	0		0	•	•	•	•	•	•	•		*
0.05	0.		0									1.
8.10	0	0	0									
5.15	0	0	0									
8.20	0	0	0									
0.25	0	0	n									
8.30	0	0	0									
1.35	0	0	0									
1.40	0	0	0									
0.45	9	0	0									
8.50	22	0	0#									
o.55	53	1	0***									
8.60	120	2	0****									
c . 55	377	8	O * * * * * * * * * * * * * * * * * * *	****								
6.70	712	15	()*********	******	********							
€.75	881	18	0 * * * * * * * * * * * * * * * * * * *		*********	******	*					
8.80	1396	28	O	******	*********	******	*********		*****			
0.35	983	20	0 *** * * * * * * * * * * * * * * * * *	*******	*********	******	*****					
8.90	344	7	O	***								
8.95	12	0	0#									
NUMBER	UF TEM	P. GR	EATER THAN 8.95	= 0	NUMBER	OF OBSE	RVATIONS =	4909	MEAN	TEMP = 8	.77 DEG. C	•

FIG. 24D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970.

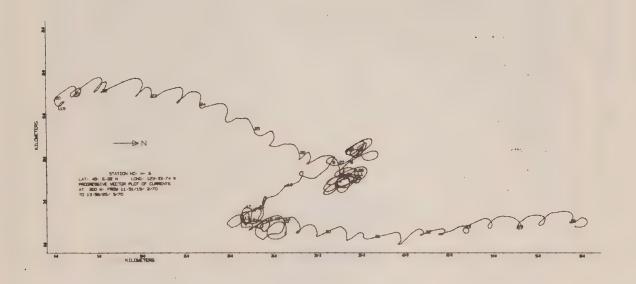


Fig. 24e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of corrent velocity from records obtained at 10-minute intervals over 34-day period during February 19 through March 25, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 15.58/25/ 3/70 TO 23. 8/25/ 4/70

MAAN		JENCY		200	300	400	500	600	700	800	900	1000
SPEED		PCT.	II	I	I	I	I	1	I	I	I	. 1
0 .	O		0									1
10	150	3	() * * * * * * * * * * * * * * * * * * *									
20	70	2	0 * * * * * *									
30	120	3	0									
40	235	5	0	********	•							
50	254	6	0	*********	**							
60	507	11	0				*****					
70	335	7	0	*********		*						
80	495	11	0	********	*******	********	*****					
90	280	6	0	********								
100	260	6	0 *** * * * * * * * * * * * * * * * * *	*********								
110	319	7	0 *** *** *** *** *** *** *** *** *** *	********	*******							
120	170	4	0 *** * * * * * * * * * * * * * * * * *	***								
130	217	5	0	*******								
140	155	3	0	**								
150	192	4	0 * * * * * * * * * * * * * * * * * * *	****								
160	97	2	0 * * * * * * * * * * * * * * * * * * *									
170	99	2	0 * * * * * * * * * *									
180	125	3	0									
190	65	1	0*****									
200	91	2	() * * * * * * * *									
210	52	1	7****									
220	62	1	0 * * * * *									
230	34	1	0 * * *									
240	27	1	9***									
250	33	1	0***									
250	16	0	0##									
270	18		9**									
280	13	0	0*									
290	5		0#									
300	4	0	0									
310	5	0	0*									
NUMBER (JF SPEE	DS GR	REATER THAN 31	.0 = 0	NUM	BER OF OBS	ERVATIONS :	45 08	MEAI	N SPEED =	101 HM/S	EC

FIG. 25A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 31-DAY PERIOD DURING MARCH 25 THROUGH APRIL 25, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED",

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES OBSERVATION PERIOD, FROM 15.58/25/ 3/70 TO 23. 8/25/ 4/70

MEAN DIR.	FREQUENCY NO. PCT.		00
0	105 2		*
5 .	105 2	0.0000000000000000000000000000000000000	
10	90 2	0**********************************	
15	78 2	0	
20 25	113 3 55 1	()	
30	46 1	0.888888888888888888888	
35	45 1	0	
40	40 1	0************	
45	50 1	0	
50	42 1	0	
55	32 1	0	
60 65	50 1 46 1	0***************	
70	47 1	0.0000000000000000000000000000000000000	
75	29 1	0**********	
80	41 1	0.0000000000000000000000000000000000000	
85	53 1	0-22-4	
90	52 1	0	
95	45 1	0	
100	32 1	O+++++++++++++++++++++++++++++++++++++	
105 110	47 1 65 1		
115	51 1	0	
120	74 2	0	
125	58 1		
130	92 2	0.0000000000000000000000000000000000000	
135	104 2	0	
140	101 2	0 *** *** *** *** *** *** *** *** *** *	
145	107 2	() ************************************	
150 155	93 2 84 2	()	
160	88 2	0	
165	98 2	0********************************	
170	78 2	0	
175	87 2	0 *****************************	
180	77 2	0***********************	
185	80 2	0*****************************	
190 195	54 1 58 1	() = = = = = = = = = = = = = = = = = = =	
200	45 1	0**************************************	
295	57 1	0*******************	
210	44 1	0 *************************************	
215	40 1	0***********	
220	21 0	0******	
225 230	27 1 23 1	()************************************	
235	29 1	0	
240	27 1	0**********	
245	34 1	0	
250	41 1	0	
255	30 1	0********	
260	23 1	() ************************************	
265 270	32 1 33 1		
275	40 1	0***************	
280	29 1	0*********	
285	29 1	0*************	
290	37 1	0************	
295	42 1	0**********	
300	53 1		
305 310	57 1 51 1		
315	77 2	***************************************	
320		0	
325	87 2	() *****************************	
330		0	
335		0*********************************	
340		0**************************************	
345 350			
355	108 2	0**************************************	

NUMBER OF OBSERVATIONS = 4508

FIG. 25B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 31-DAY PERIOD DURING MARCH 25 THROUGH APRIL 25, 1970.

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W
DIRECTION HISTOGRAM FOR CURRENTS AT 200 M. FROM 15.58/25/ 3/70 TO 23. 8/25/ 4/70

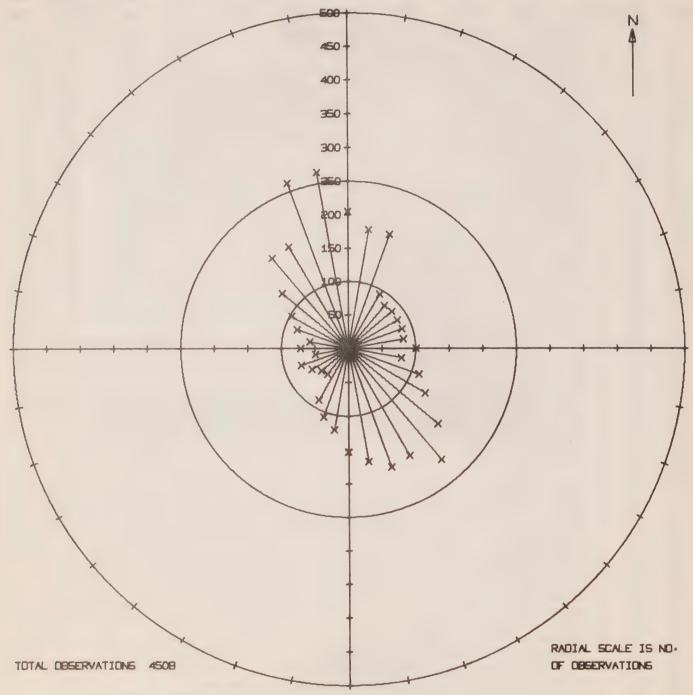


FIG. 25c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 31-DAY PERIOD DURING MARCH 25 THROUGH APRIL 25, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS OBSERVATION PERIOD, FROM 15.58/25/ 3/70 TO 23. 8/25/ 4/70

MEAN TEMP.		F. I	100 I	200 I	00E I	400 I	500 . I	000	700 I	800 I	900	1000
0.00 6.05	0	0 0										
6.10	J	0 0										
6.15		0 0										
6.25	n	0 0										
6.35	0	0 0										
6.40	0	0 0										
6.50	0	0 0										
6.55 6.60		0 0										
6.65 6.70	0	0 0										
6.75	0	0 0										
6.85		0 0										
6.90	Э	0 0					•					
7.00	0	0 0										
7.05 7.10		0 0										
7.15	0	0 0										
7.20 7.25	0	0 0										
7.30 7.35		0 0										
7.40	0	0 0										
7.45 7.50	0	0 0										
7.55 7.60	0 1	0 0										
7.65 7.70	1 0	0 0										
7.75	2	0 0										
7.80 7.85	0	0 0										
7.90 7.95	0	0 0										
8.00	0	0 0										
8.05 8.10	0	0 0										
8.15	0	0 7										
8.75	0	0 0										
6.30 8.35	26 146	1 0*		****								
8.40	132 152	3 0*		***								
8.50	170	4 0#	*******	*****								
8.55	249 371	6 0# 8 0#		**********	********	***						
8.65				**********		********		• • • • • • • • • • • • • • • • • • • •	• •			
8.75	676	15 04	*******	**********	*********	********		********	****			
8.80 8.85	356			********		***						
8.90 8.95	15 4	0 0	• •									
9.00	0	0 0										
9.05 9.10	0	0 0										
9.15 9.20	0 5	0 0										
9.25	6	0 0										
9.30	4 2	2 2										
9.40 9.45	1 3	0 0										
9.50	2	0 0										
9.55	2	c 0										
9.65	4	0 0										
NUMBER	UF TEMP.	GREA	TER THAN	9.65 = 0	NUMB	ER OF OBSI	ERVATIONS =	4508	MEAN	TEMP =	8.68 DEG. C.	•

FIG. 25D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 31-DAY PERIOD DURING MARCH 25 THROUGH



March 25 through April 25, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 31-day period during Fig. 25e.

1000

LAT. 49- 6.22 N LONG. 123-33.74 W

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES OBSERVATION PERIOD. FROM 14. 2/27/ 4/70 TO 13.19/ 8/ 6/70

MEAN	FREQU	ENCY	2 10	00	200	300	400	500	600	700	800	900	100
SPEED	NO.				1	I	Ī	I	1	I	I	I	
0	0	0							•	•	_	•	
10	24	0	0**										
20	40	1	0 ****										
30	69	1	0 * * * * * * *										
40	175	3	0										
50	169	3	0 *******										
60	364	6	0		******		***						
70	353	6	0 * * * * * * * * *		*****		**						
80	745	12	() * * * * * * * * *				*******			*********			
90	527						********						
100	498	8					*******						
110	635	11							*********				
120	325	5	() * * * * * * * *										
130	486		0				********	****					
140 150	264 307	4	0 * * * * * * * * * * * * * * * * * * *										
160	159		0			*****							
170	153	3	C * * * * * * * * * * * *										
190	182	3	0 *** * * * * * *		40								
190	76	ī	0 *******										
200	119		0 ********										
210	50		0 * * * * *										
220	83	1	0*******										
230	40	1	0***										
240	41	1	0 * * * *										
250	54	1	0++++										
260	35	1	0 * * * *										
270	24	0	0++										
280	13	0											
290	9	0	0*										
300	3 7	0	0										
310 320	8	0	9*										
330	3	0	0										
340	ó	0	0										
350	1	0	0										
360	0	0	0										
370	0	0	0										
380	0	0	0										
390	0												
400	0	0	0										
410	C	0	0										
420	0	0	0										
430 440	0	0	0										
440	1	0	0										
460	0	0	0										
470	0	0	a										
480	0	Ö	0										
490	Ö	ō	0										
500	0 .	0	0										
510	0	0	0										
520	0	0	0										
530	0	0	0										
540	0	0	0										
550	0	0	0										
560	0	0	0										
570	0	0	0										
580 590	0	0	0										
600	0	0	0										
610	0	0	0										
620	1		0										
020	•												
NUMBER	OF SPEE	EDS GI	REATER THA	N 620 =	0	NUA	BER OF OBSE	RVATIONS	= 6043	MEAN	SPEED =	114 MM/SEC	

A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS FIG. 26A. OBTAINED AT 10-MINUTE INTERVALS OVER 42-DAY PERIOD DURING APRIL 27 THROUGH JUNE 8, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES UBSERVATION PERIOD, FROM 14. 2/27/ 4/70 TO 13.19/ 8/ 6/70

MEAN	FREAL	FNCV	0 50 100	150		200	250	200	150			
MEAN		JENCY		150		200	250	300	350	400	450	500
DIR.	NO.	PCT.		I		1	I	1	1	1	I	I
0	85	1	0									
5	79	1	0									
10	66	1	0 **********									
15	69	1	0									
20	102	2	() * * * * * * * * * * * * * * * * * * *									
25	73	1	0									
30	77	1) * * * * * * * * * * * * * * * * * * *									
35	59	1	0 * * * * * * * * * * * * * * * * * * *									
40	10	1	0 *** * * * * * * * * * * * * * * * * *									
45	53	1	0									
50	59	1	0									
5.5	61	1	0*******									
60	64	1	0 *** * * * * * * * * * * * * * * * * *									
65	76	1	Casaa******									
70	65	1)*********									
75	73	1	()**********									
80	76	1	O*********									
85	6.8	1	0********									
90	91	2	() * * * * * * * * * * * * * * * * * * *									
95	93	2	0									
100	96	2	()*************									
105	126	2	O**************	***								
110	132	2										
115	146	2)***********	******								
120	134	2	O * * * * * * * * * * * * * * * * * * *	****								
125	105	2	() * * * * * * * * * * * * * * * * * * *									
130	109	2	() * * * * * * * * * * * * * * * * * * *	*								
135	117	2	0	* *								
140	123	2	0									
145	105	2	O									
150	91	2	0 *** *** * * * * * * * * * * * * * * *									
155	88	1	~~~~~~~~~~									
160	84	1	(******									
165	85	1	0 *** * * * * * * * * * * * * * * * * *									
170	02	1	() * * * * * * * * * * * *									
175	53	1	0 ********									
190	43	1)******									
185	46	1	2******									
190	45	1	0 *** *** * *									
195	43	1	0 * * * * * * * *									
200	51	1	0*****									
205	50	1	0 *******									
210	31	1	0*****									
215	35	1	0*****									
220	47	1	0*****									
225	45	1	0******									
230	43	1)******									
235	43	1	O******									
240	37	1)*****									
245	23	0	0****									
250	37	1	0*****				•					
255	47	1	0									
260	45	1	0 ******									
265	46	ī	O******									
270	42	i	0*****									
275	72	ī	0 **********									
280	64	ī	0									
285	55	1	0******									
290	69	ī	0*********									
295	78	1	0*********									
300	73	î	0******									
305	117	2	0************									
310	103	2	0***********									
315	138		0***********									
320	167		0************									
325	177	3	0************									
330	162	3	() ****************									
335	224		0									
340	167		0 *************									
345												
	175		0		*****							
350	147		0									
355	121	2	0	***								
LUMBER	00.00											

FIG. 26B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 42-DAY PERIOD DURING APRIL 27 THROUGH JUNE 8, 1970.

JUMBER OF OBSERVATIONS = 6043

STATION NO. H- 6 LAT. 49- 6.22 N LONG. 123-33.74 W
DIRECTION HISTOGRAM FOR CURRENTS AT 200 M. FROM 14. 2/27/ 4/70 TO 13.19/ 8/ 6/70

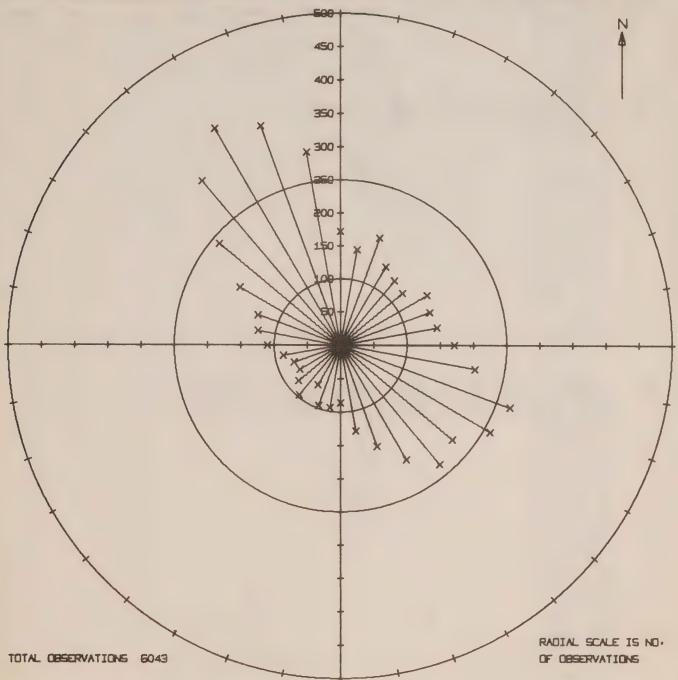


FIG. 26c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 42-DAY PERIOD DURING APRIL 27 THROUGH JUNE 8, 1970.

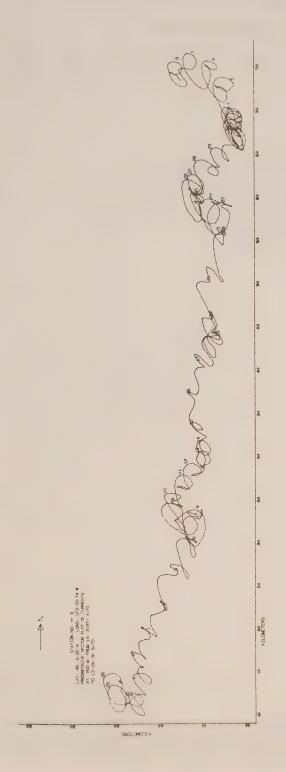
STATION NO. H- 6 LAT. 49- 6.22 N

LONG. 123-33.74 W

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS OBSERVATION PERIOD, FROM 14. 2/27/ 4/70 TO 13.19/ 8/ 6/70

MCAN FCMP. 8.00 8.05 8.10 6.15 8.20 6.25 8.30 8.35 8.40	FREQUENCE: NO. 0 0 0 0 6 127 1247 2743	JENCY PCT. 0 0 0 0 0 0 0 2 21 45		500 I	1000	1500 I	2000	2500 ·	3000	3500 I	4000 I	4500 1	5000 I
8.45	1045	17	0						_				
8.50	612	10	0 *****										
8.55	228	4	0****										
8.60	19	0	0										
8.65	8	0	n										
e.70	3	0	0										
8.75	ő	0	ŋ										
8.80	Ö		Ó										
8.85	0	0	9										
8.90	0	0	0										
8.95	0	0	0										
9.00	0	0	0										
9.05	0	0	0										
9.10	0	0	0										
9.15	0	О	0										
9.20	0	0	0										
9.25	4	0	()										
4.30	0	U	0										
9.35	0	0	0										
9.40	0	0	0										
9.45	0	0	0										
9.50	1	O	0										
NUMBER	OF TEM	P. GR	EATER TH	HAN 9.50	= 0	NUMBER	OF OB	SERVATIONS =	6043	MEAN	TEMP = 8	.41 DEG. C	

A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS FIG. 26p. OBTAINED AT 10-MINUTE INTERVALS OVER 42-DAY PERIOD DURING APRIL 27 THROUGH JUNE 8, 1970.



during April 27 through June 8, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument west components of current velocity from records obtained at 10-minute intervals over 42-day period A progressive vector diagram constructed from successive cumulative values of north-south and eastwas the same as at this location.

Fig. 26e.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 9.13/10/ 6/70 TO 12.19/27/ 7/70

MEAN SPEED		DENCY PCT.		100 I	200	300 I	400 I	500 I	600	700 I	800 I	900 I	1000 I
0	0	0		•	•	•		•	•	•	•	•	•
10	10	V											
20 30	11 22		0 * 0 * *										
40	63		0 = = = = =										
50	50	1	0 * * * *										
60	137	2	0 *** * * *										
70 80	191 416	3 6	0 * * * * * *										
90	437	6											
100	502	7	0	• • • • • • •			• • • • • • • • • •						
110	655						••••••			***			
120 130	496 684	7 10						· • • • • • • • • • • • • • • • • • • •					
140	383	6											
150	572	8						********	***				
160	331	5											
170 180	325 398	5	0****										
190	215	3											
200	270	4			*********	****							
210 220	140 171	2	0 * * * * * *										
230	80	1	0										
240	51		0 * * * *										
250	77	1	0****	**									
260 270	27 23		0 * * *										
280	10	3											
290	9	0	0+										
300	7		0*										
310 320	7 5	0	0*										
330	3	0	0										
340	3	0	0										
350	2	0	0										
360 370	2	0	0										
380	Ö	o	0										
390	0	0	0										
400 410	0	0	0										
420	0	0	0										
430	0	0	0										
440 450	0	0	0										
460	1 0	0	0										
470	0	0	0										
480	0	0	0										
490 500	0	0	0										
510	ō	0	0										
520	0	0	0										
530	0	0	0										
540 550	0	0	0										
560	0	0	0										
570	0	0	0										
580 590	0	0	0										
600	0	Ö	0										
610	1	0	0										
NUMBER	OF SPE	EDS GF	REATER T	HAN 6	510 = 0	NUH	BER OF OBS	ERVATIONS =	6788	MEA	N SPEED =	137 MM/SE	С

FIG. 27A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 47-DAY PERIOD DURING JUNE 10 THROUGH JULY 27, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 9.10/10/ 6/70 TO 12.19/27/ 7/70

MEAN	FREQUI			100	150	200	250	300	350	400	450	50
UIR.	NO. 1	PCT.	I I	1	I	I	I	I	I	I	I	
5	197	3	0 * * * * * * * * * * * * * * * * * * *				***					
10 .	153	2	0									
15	127	2	0 *********		***							
20	191	3	0		**********	* * * *						
25	91	1	0 *********									
30	94	1	()*********									
35 40	50 72	1	0 *** *** *** ***									
45	66	î	0******									
50	44	1	0*****									
55	62	1	0 ********									
60	56	1	0 ********									
65 70	38 52	1	0 * * * * * * * * * * * * * * * * * * *									
75	50	1	0 * * * * * * * * * *									
80	41	1	0 ******									
85	44	1	O*******									
90	29	0	0 *****									
95	49	1	0*******									
100 105	48 39	1	()*******									
110	42	1	0 ******									
115	40	1	() * * * * * * *									
120	47	1	0 ********									
125	56	1	0********									
130 135	64 65	1	0 ***********									
140	49	1	0******									
145	54	1	0********									
150	59	1	0 * * * * * * * * * * * * * * * * * * *									
155.	84	1	0 *** *** * * * * * * * * * * * * * * *									
160 165	92 113	1 2	0 **********									
170	151	2	0									
1/5	209	3	0		*********							
180	219	3	0 **********									
185	236	3	0*********									
190 195	234 182	3	0 *** * * * * * * * * * * * * * * * * *				**					
200	155	2	()**********									
205	129	2	0	*******	****							
210	108	2	0									
215 220	105 94	2	0									
225	101	1	0 *** * * * * * * * * * * * * * * * * *									
230	83	1	0 ** * * * * * * * * *									
235	84	1	9*********	* * * *								
240	86	1	0 ***********									
245	104	2	0 ***********									
250 255	96 77	1	0 *** * * * * * * * * * * * * * * * * *									
260	56	1	0 * * * * * * * * * * *									
265	56	1	0 * * * * * * * * * * *									
270	51	1	0*******									
275	59	1	0									
280 285	59 54	1	0 * * * * * * * * * * * * * * * * * * *									
290	37	1	0*****									
295	57	1	0 *********									
300	46	1	0 *** * * * * *									
305	44	1	0 *** * * * * * * * * * * * * * * * * *									
310 315	61 62	1	0 * * * * * * * * * * * * * * * * * * *									
320	75	1	0	• •								
325	90	1	0 *** * * * * * * * * * * * * * * * * *									
330	107	2	0									
335	134	2										
340 345	137 169	2	0 **********									
350	208	3	0			******						
355	177		0 **********									

NUMBER OF OBSERVATIONS = 6788

FIG. 27B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 47-DAY PERIOD DURING JUNE 20 THROUGH JULY 27, 1970.

STATION NO. H- 6 LAT. 48- 6.22 N LONG. 123-33.74 W
DIRECTION HISTOGRAM FOR CLRRENTS AT 200 M. FROM 9.10/10/ 6/70 TO 12.19/27/ 7/70

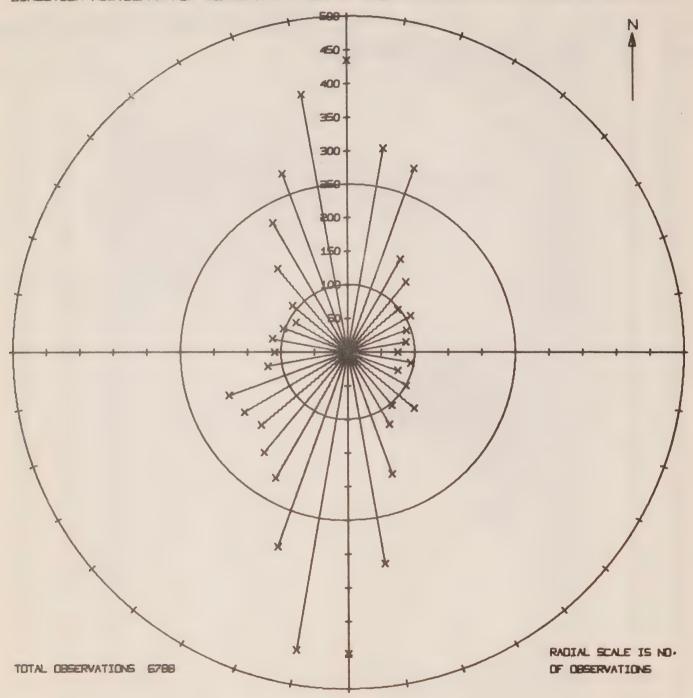


FIG. 27c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 47-DAY PERIOD DURING JUNE 10 THROUGH JULY 27, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS OBSERVATION PERIOD, FROM 9.10/10/ 6/70 TO 12.19/27/ 7/70

MEAN		UENCY		500	1000	1500	2000	2500	3000	3500	4000	4500	5000
TEMP.	NO.	PCT.	I	I	1 I	I	I	I	I	I	I	Ī	1
6.00	0	0	0										
6.05	0	0	0										
6.10	0	0	0										
6.15	0	0	0										
6.20	0	0	0										
6.25	0	0	0										
6.30	0	0	0										
0.35	0	0	0										
6.40	0	0	0										
6.45	0	0	0										
6.50	24	0	0										
0.55	51	1	0=										
6.60	736	11	0 * * * * * *		**								
6.65	348	5	0 *****										
6.70	1091	16	0		*******								
6.75	2990	44	0*****		*******			*********					
6.80	671	10	0 * * * * * *										
6.85	412	6	0*****										
6.90	222	3	0 * * * *										
6.95	153	2	9444										
7.00	24	0	0										
7.05	15	0	0										
7.10	33	0	0+										
7.15	6	0	0										
7.20	6	0	0										
7.25	6	0	0										
NUMBER	OF TEM	IP. GR	EATER TH	AN 7.2	5 = 0	NUME	BER OF OBSE	RVATIONS :	- 6788	MEAF	TEMP = 6	.74 DEG. C	

FIG. 27b. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 47-DAY PERIOD DURING JUNE 10 THROUGH JULY 27, 1970.

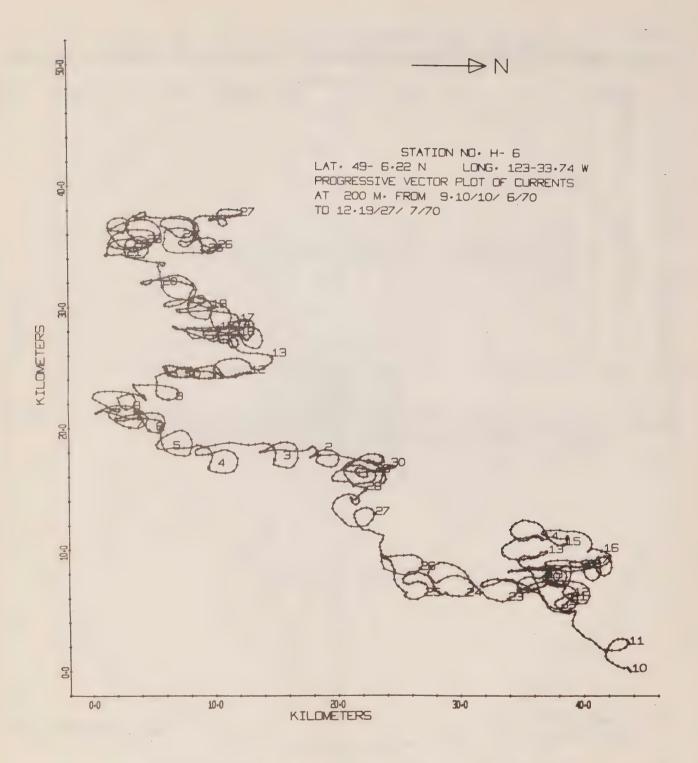
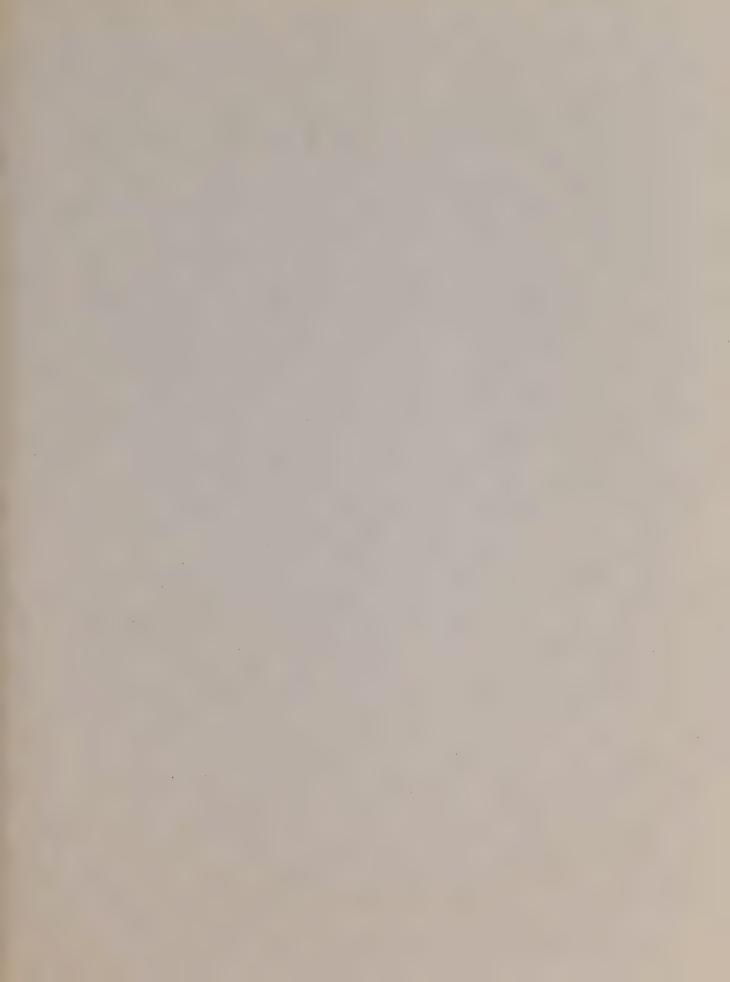


Fig. 27e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 47-day period during June 10 through July 27, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.



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-72R08

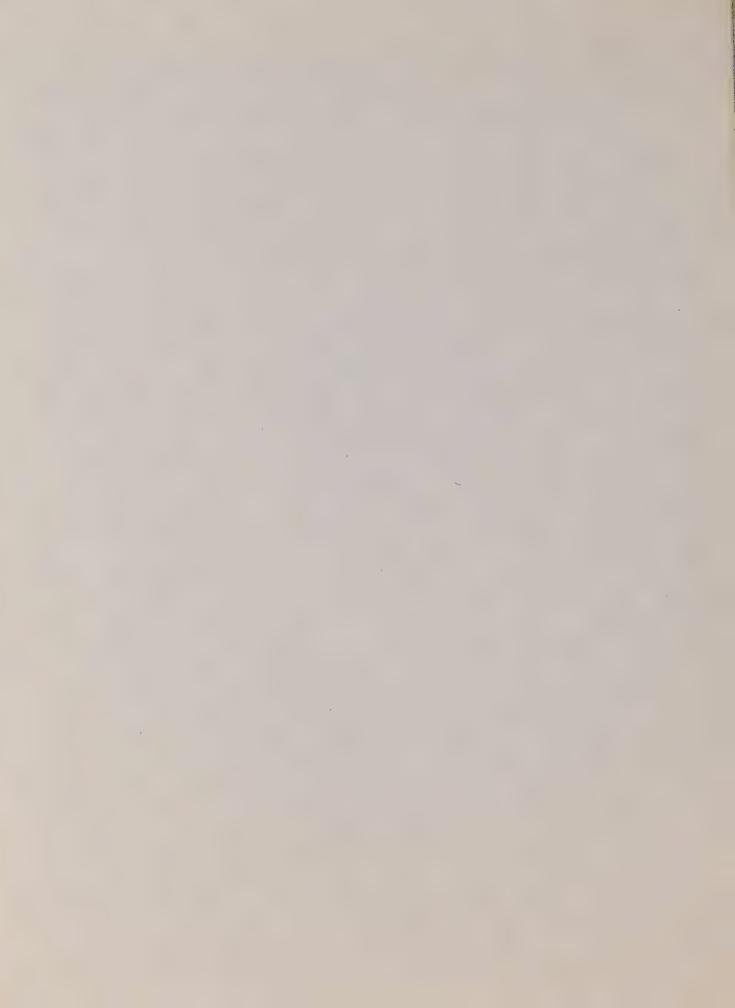
SUMMARY OF OCEANOGRAPHIC RECORDS
OBTAINED FROM MOORED INSTRUMENTS
IN THE STRAIT OF GEORGIA — 1969 - 1970
Current Velocity and Seawater Temperature
from Station H-16

S. Tabata, J.A. Stickland



ENVIRONMENT CANADA
Water Management Service
Marine Sciences Branch
Pacific Region
1230 Government St.
Victoria, B.C.





MARINE SCIENCES BRANCH, PACIFIC REGION
PACIFIC MARINE SCIENCE REPORT NO. 72-8

SUMMARY OF OCEANOGRAPHIC RECORDS

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Current Velocity and Seawater Temperature

from Station H-16

by

S. Tabata and J.A. Stickland

Victoria, B.C.
Marine Sciences Branch, Pacific Region
Environment Canada

May, 1972



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INTRODUCTION

The waters of the Strait of Georgia have been the subject of many oceanographic studies for more than half a century. The earlier studies of the region consisted mainly of physical, chemical and biological oceanographic descriptions of the waters and some of the main factors affecting the properties of the waters therein. The studies vary, in scope, from a brief initial description of the waters by Fraser and Cameron (1916) and a more detailed work by Hutchinson and Lucas (1931) and to a more complete treatment by Waldichuk (1957), to name a few.

In spite of the number of oceanographic studies made on these waters there was a notable lack of reliable information of the surface and subsurface circulation in the Strait. In order to relieve this deficiency, the Pacific Oceanographic Group embarked on a limited program of current velocity observations in the central portion of the Strait of Georgia. The initial observations consisted only of surface drift measurements, the results of which have already been reported (Giovando and Tabata, 1970) and a series of velocity profile measurements from anchored vessels, the results of which have also been reported (Tabata, Stickland, Wong and Giovando, 1970 (a); 1970(b); 1970(c)).

In recent years the marine technology associated with automated oceanographic observations from moored instruments has advanced to the stage where it is now possible to obtain reliable data from unattended instruments for periods exceeding one month. The present series of observations to be reported here are based on data obtained from such instruments.

The primary objective of the present program of observations is to obtain current velocity records at sufficiently high frequency and of sufficient length so that it would be possible to examine the spectrum of the variability of current velocities in the frequency band between l cycle and 10^{-3} cycle per hour (period of few hours to few months approximately), at a representative area of the central Strait. Such data would provide, in addition to basic scientific information, solid background material that would be useful in a variety of applied oceanographic studies such as those associated with pollution and fisheries. As most of the instruments employed recorded temperatures of the water as well as current velocities, they too are reported.

A report describing the observational program, performances of current meters used, mooring technique, computer data-processing method, etc. has already been published in the Technical Report Series of the Fisheries Research Board of Canada (Tabata, Stickland and de Lange Boom, 1971). The summary of observations obtained from Station H-06 has already been published in Pacific Marine Science Report No. 72-7 (Tabata and Stickland, 1972).

The present report comprises the summary of oceanographic measurements obtained from Station H-16 (Fig. 1 and 2). It is the third of the series of reports associated with the program of oceanographic observations from moored instruments in the Strait of Georgia to be issued.

The summary contains:

- 1) histogram of current speed
- 2) histogram of current direction
- 3) histogram of current direction in polar form
- 4) histogram of temperature (if applicable)
- 5) progressive vector diagram of current velocities

Local standard time, Pacific Standard Time (P.S.T.), is used throughout (time zone + 8).

BACKGROUND INFORMATION

The only current measurements made in the open waters of the Strait, prior to 1953, were by means of drift bottles. They were carried out under the direction of Dr. W.A. Clemens. The data so obtained have been used later to interpret the surface circulation in the Strait of Georgia, (Waldichuk, 1957; Waldichuk, 1958).

In 1953, for the first time in the Strait, current observations were made at 8 fixed locations in the Strait from an anchored ship (Waldichuk, 1957). They were generally taken at hourly intervals at selected depths for a period of one tidal day (25 hours) at each station. While surface currents were observed by means of a customary captive drift pole, subsurface currents were measured with an Ekman Current Meter.

A year later, a series of 6 stations was occupied between Tsawwassen and Galiano Island (Fig. 1) and surface and bottom currents were measured for one tidal day at each of the stations (Pickard, 1956). The surface currents were observed at half-hourly intervals utilizing a drift pole while the bottom currents were measured with an Ekman Current Meter at hourly intervals.

During the summer of 1963 a series of 3 stations in a line between Nanaimo and Sechelt (Fig. 1) was occupied by the Canadian Hydrographic Service and currents were measured at depths of 5, 100 and 300 metres (m) with self-recording BBT (Neyrpic) current metres (analogue output) at each of these stations at 20-minute intervals for period up to 30 days (Huggett, 1966). The method used to obtain the data represents a significant improvement over previous methods. However, even when currents were measured in this manner, the results indicated inconsistency in the day-to-day flow patterns although the 15-day averages did indicated the presence of clockwise rotary tidal currents.

LOCATION OF STATIONS

A line of 3 stations, H-06, H-16 and H-26, placed 10 kilometres (km) apart, was established between Valdes Island to the west and Point Grey to the east in April 1969 (Fig. 1). They remained stationed until the completion of the survey in September 1970. As is evident from Fig. 2, the western half of the line is deeper than the eastern side, the maximum depth being located a few kilometres east of Station H-06. The small ridge shown to the east of Station H-16 is part of a shoal having a minimum depth of 146m and situated within a few kilometres to the southeast of the ridge shown in the Figure.

The positions* and the depths of the 3 stations are:

H-06	Latitude 49°06.23'N Longitude 123° 33.70'W Depth 252m
H-16	Latitude 49° 09.07'N Longitude 123° 26.75'W Depth 295m
H-26	Latitude 49° 11.93'N Longitude 123° 19.80'W Depth 162m

^{*} The exact locations of these stations are generally within one-half mile of those indicated above.

COMMENTS

Station H-16

Subsurface-Buoy Mooring

April 16 through May 15, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 98)

29-day period. No comment.

200m Aanderaa Current Meter (Serial No. 97)
29-day period. Current speed unreliable
from April 22, 1969 onward. Noted loose

rotor during subsequent mooring.

May 15 through June 18, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 98)

34-day period. No comment.

200m Aanderaa Current Meter (Serial No. 97) 34-day period. Loose rotor noted. Histo-

gram of current speed not made.

Note: Profiles of current velocities in upper 50m depth obtained at the position of surface buoy, employing Hydro Products current meter during 0820 on May 21, 1969 through 1005 on May 23, 1969. Hydrographic cast made at 0817 on May 23, 1969. Bathythermograph observations made at 0855 on May 23, 1969.

June 18 through July 28, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 98)

22-day period. No comment.

200m Aanderaa Current Meter (Serial No. 97)

22-day period. No comment.

July 10 through August 28, 1969.

49-day period. No comment.

Aanderaa Current Meter (Serial No. 97)
43-day period. Clock inoperative when retrieved. Sampling intervals assumed to be same as during previous observations. Time of clock stoppage (August 22) estimated

from number of observations made.

August 28 through September 18, 1969.

21-day period. No comment.

200m Aanderaa Current Meter (Serial No. 97)
21-day period. Temperature unreliable from
September 6th. Temperature histogram com-

piled from 9 days of observations only.

September 18 through October 16, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 98)

28-day period. No comment.

200m Aanderaa Current Meter (Serial No. 97) 28-day period. Temperature record erratic

- not included in this data report.

COMMENTS (cont'd)

October 16 through November 25, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 98)

40-day period. No comment.

200m Aanderaa Current Meter (Serial No. 97)

27-day period. Clock inoperative when current meter retrieved. Sampling intervals assumed to be same as during previous observations. Time of clock stoppage (November 12) estimated from number of observations made.

Note: Bathythermograph observations and hydrographic cast made at 1130

and 1135, respectively on November 25, 1969.

November 25, 1969 through January 9, 1970.

Instrument Depth: 40m Geodyne*Current Meter (Serial No. M-187)

45-day period. This instrument used to back up instrument (Aanderaa meter No. 97) placed at

50m depth.

50m Aanderaa Current Meter (Serial No. 97)

This instrument failed to operate, but not for the reason suspected (clock failure). Poor battery connection was the cause of malfunction.

200m Aanderaa Current Meter (Serial No. 98)

45-day period. No comment.

January 9 through February 20, 1970.

Instrument Depth: 50m Geodyne Current Meter (Serial No. M-183)

41-day period. No comment.

200m Aanderaa Current Meter (Serial No. 98)

41-day period. Clock operating when instrument retrieved but number of observations showed that clock stopped approximately 7 hours before meter retrieved, if sampling rate assumed to be same as during previous observations. Clock probably started again when instrument shaken

during retrieval.

Note: Bathythermograph observation and hydrographic cast made at 1420 on January 9, 1970.

February 20 through March 25, 1970.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 98)

33-day period. No comment.

200m Aanderaa Current Meter (Serial No. 101)

33-day period. No comment.

March 25 through April 28, 1970.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 98)

32-day period. Last 2 days of records "dirty"

- not included in this data report.

200m Aanderaa Current Meter (Serial No. 101)

34-day period. No comment.

COMMENTS (cont'd)

Taut-Rope Mooring

April 28 through June 10, 1970.

Instrument Depth: 3m Geodyne Current Meter (Serial No. M-183)

36-day period. Meter lifted out of water for 1 minute at 0825 on May 25, 1970 for inspection. Processed data showed meter stopped operating on June 3, 1970. But clock operating when meter retrieved. Clock probably started to operate when hit by barge.

50m Aanderaa Current Meter (Serial No. 98)

43-day period. No comment.

200m Aanderaa Current Meter (Serial No. 101)

43-day period. No comment.

Note: Gap of 2 days present between start of this series of measurements and end of previous one. Surface buoy ran over by a barge of June 9, 1970, damaging Geodyne current meter (M-183) placed at 3m depth and Aanderaa current meter (98) placed at 50m depth (by tow line).

June 14 through July 28, 1970.

Instrument Depth: 3m Geodyne Current Meter (Serial No. M-183)

39-day period. Processed data showed meter

stopped operating on July 23, 1970.

Aanderaa Current Meter (Serial No. 100)
44-day period. No comment.

Note: Gap of 4 days present between start of this series of measurements and end of previous one.

July 28 through September 24, 1970.

Instrument Depth: 3m Geodyne Current Meter (Serial No. M-228)

29-day period. Snagged by gill net. Processed data showed that accident occurred on

September 3, 1970.

50m Aanderaa Current Meter (Serial No. 100)

58-day period. No comment.

^{*} It is to be noted that while the Aanderaa (Bergen) Current Meter used in the present program was made to sample every 10 minutes, the Geodyne Current Meter was set to "burst-sample" every 15 minutes (that is, every 15 minutes it recorded 15 samples at 5-second intervals).

ACKNOWLEDGEMENT

The acquisition of, and the processing of oceanographic data obtained from moored instruments require the assistance and cooperation of many individuals and groups. We acknowledge the assistance rendered by the staff of the Nanaimo Biological Station of the Fisheries Research Board of Canada, of the Pacific Oceanographic Group of the Marine Sciences Branch (now at the Pacific Environment Institute at West Vancouver, B.C.), of the Tidal and Current Survey of the Marine Sciences Branch and the officers and men of the research vessels, C.G.S. Parizeau (M.S.B.), C.G.S. Vector (M.S.B.) and C.G.S. A.P. Knight (F.R.B.C.). Individuals associated with the above were duly acknowledged in our first report. Since the publication of the first report in 1971, a number of people have assisted in the computerprocessing of data and in the preparation of illustrations. We appreciate the generous assistance given by Mr. J.A.C. Thomson and Mrs. A. Sandnes of the Computing Centre at the Nanaimo Biological Station, Messrs. B. de Lange Boom and I. Daniel who processed the data, Miss T.A. Findlay who prepared the illustrations, and Mr. C. Morley of the Nanaimo Biological Station and Mr. R. Banyard of the Canadian Hydrographic Service of the Marine Sciences Branch who photo-reproduced all the illustrations. We owe our thanks to Miss M. Dyer for organizing and making the preparatory work essential to the publication of this report.

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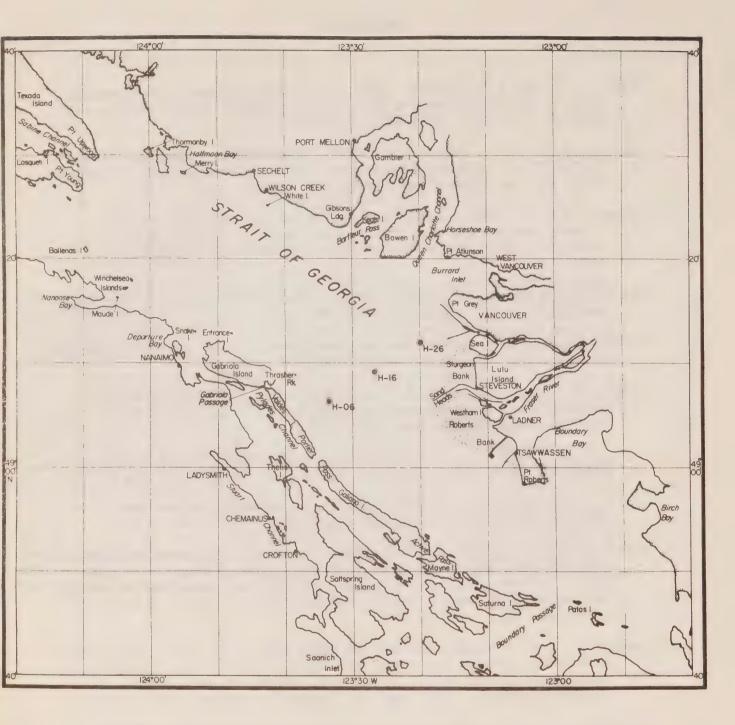
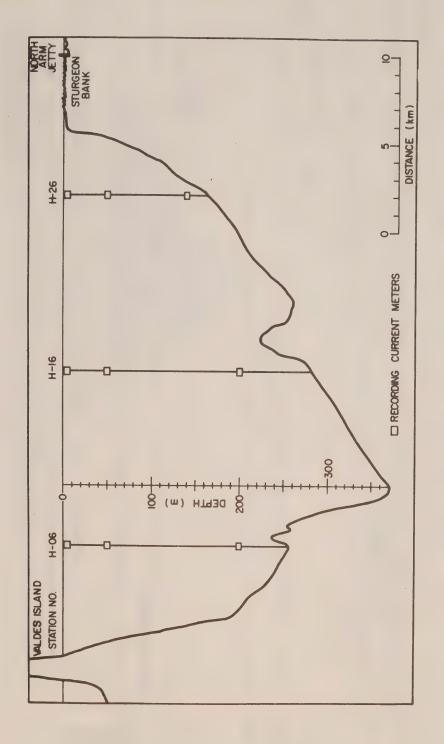
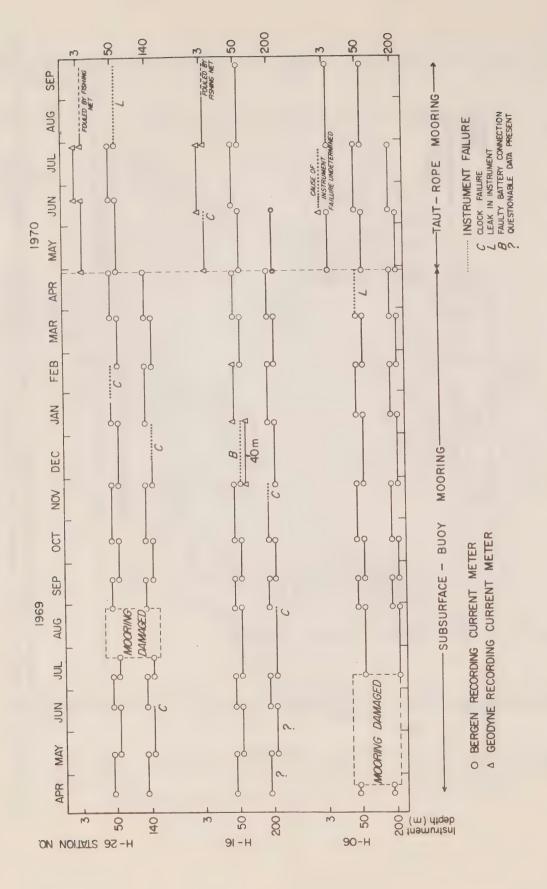


Fig. 1. Location of stations in the central Strait of Georgia where observations were made. The records described in this report were obtained at Station H-16.



Cross-section along the line of stations H-06, H-16 and H-26, between Valdes Island and Point Grey. The records described in this report were obtained at Station H-16.



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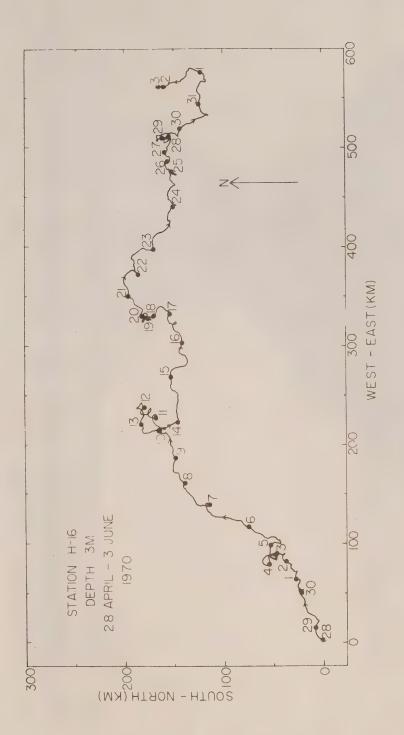
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FIG. 4B. A HISTOGRAM OF DIRECTION (*TRUE), WITH CLASS INTERVAL OF 5*, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 36-DAY PERIOD DURING APRIL 28 THROUGH JUNE 3, 1970.

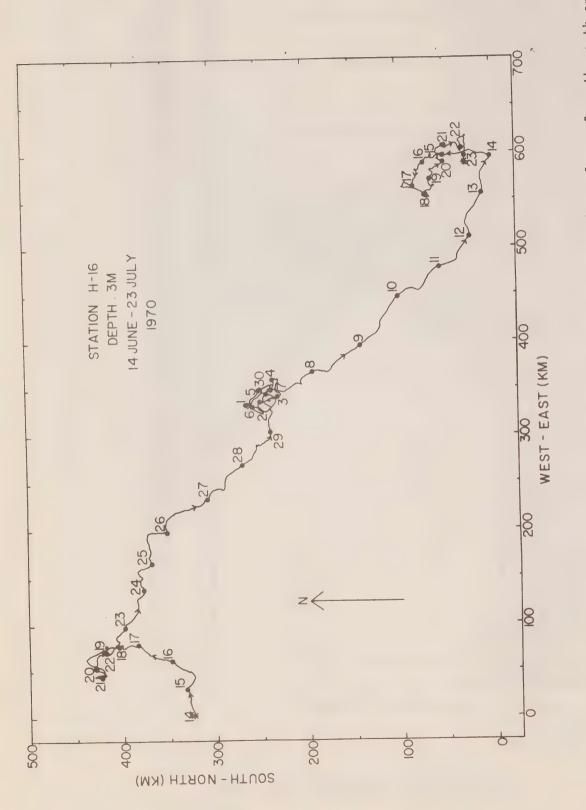


A progressive vector diagram constructed from successive cumulative values of north-south and east-west would occur if the motion in the entire neighboring area of the location of the instrument was the same components of current velocity from records obtained at 10-minute intervals over 36-day period during April 28 through June 3, 1970. The spatial scale corresponds to the displacement of the water that as at this location.

Fig. 4c.

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A progressive vector diagram constructed from successive cumulative values of north-south and east-west would occur if the motion in the entire neighboring area of the location of the instrument was the same components of current velocity from records obtained at 10-minute intervals over 44-day period during June 14 through July 23, 1970. The spatial scale corresponds to the displacement of the water that as at this location.

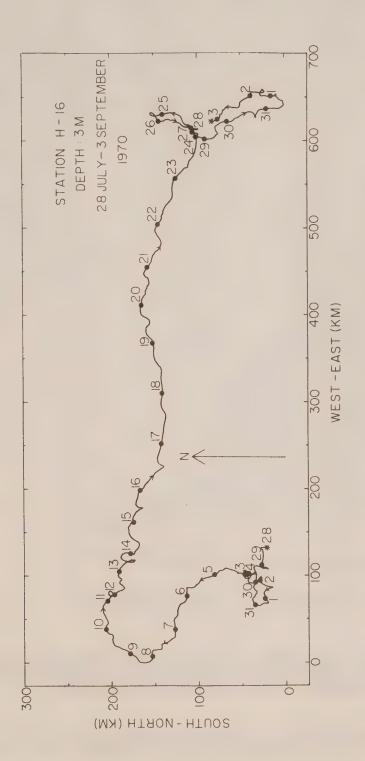
Fig. 5c.

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FIG. 6A. A HISTOGRAM OF SPEED (MMVSEC), WITH ELASS INTERVAL OF 10 MMVSEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 37-DAY PERIOD DURING JULY 28 THROUGH SEPTEMBER 3, 1970. SPEED LESS THAM OR EQUAL TO 10 MMVSEC IS CONSIDERED TO BE "ZERO SPEED".

NUMBER OF HONGSTANDARD RECORDS . 0 NUMBER OF CHECKBUM ERRORS . 0 JOS END/ 18109 JAN 08/171

DATA/ MAM228/2 / DIRECTION		
DAR P. N.	PREQUENCY 259 345	DESREES
0	144 723	3
000000000000000000000000000000000000000	403 470	11 14 17
0.000.000000000000000000000000000000000	413	17
00000000000000000000000000000000000000	376 486	53
000000000000000000000000000000000000000	725 374 461	16
000000000000000000000000000000000000000	440 318	34 37 39
000000000000000000000000000000000000000	390 504	48
00000000000000000000000000000000000000	401 671	51
00000011111111111111111111111111111111	698 375 311	53 54 59
000000000000000000000000000000000000000	418 524	62
***************************************	482 341	6 ii 7 7 j
**************************************	456 578 523	76 79 88
000000000000000000000000000000000000000	415	88
000000000000000000000000000000000000000	585 461	F7 90
00220000000000000000000000000000000000	805	96
00120000000000000000000000000000000000	736 57[678	101
000000000000000000000000000000000000000	763 676	104 107 113
000000000000000000000000000000000000000	445 599	113
4 000000000000000000000000000000000000	746 589	121
00000000000000000000000000000000000000	478 523	124 127 :29
000000000000000000000000000000000000000	680	132
000000000000000000000000000000000000000	425 479	138
000000000000000000000000000000000000000	605 506	1-3
**************************************	402	152
000000000000000000000000000000000000000	475 403 294	155 158
***************************************	361	167
***************************************	409	166 167 178 174
80ggs00gg2170447040000000000000000000000000000000	286 331 400	177
***********************	393 269	180
60000000000000000000000000000000000000	286	186 188 191
0	329	19+
000000000000000000000000000000000000000	283	5
**************************************	365 300 203	208
880000000000000000000000000000000000000	a87 331	2:217
6 ************************************	301	519
0 00000000000000000000000000000000000	203 257	527
00000000111110000000000000000000000000	35 s 31 9 21 7	253
000000000000000000000000000000000000000	267 353	535
000000000000000000000000000000000000000	346	244
0 0000000000000000000000000000000000000	260 375	280
00000000000000000000000000000000000000	375 346 244	293
000000000000000000000000000000000000000	285 373	26: 26:4 267
000000000000000000000000000000000000000	232	27.
60000+00000000000000000000000000000000	242 334	267 27 27 27 27 27 27 27
00000000000000000000000000000000000000	306 231 239	384
000000000000000000000000000000000000000	319	287 29 29
000000000000000000000000000000000000000	182	291
\$0000000000000000000000000000000000000	312 261	12.
00000000000000000000000000000000000000	194 244 299	30.
000000000000000000000000000000000000000	308 177	315 317 315
000000000000000000000000000000000000000	246	32: 32: 32:
######################################	323 212 267	325
000000000000000000000000000000000000000	361 325	937 336
000000000000000000000000000000000000000	636	938 34 342
6 00,000,000,000,000,000,000,000,000,000	249	309
90000000000000000000000000000000000000	387 481	36 g
	391	367
TOTAL NUMBER OF IMPUT DATA		
NUMBER OF DATA OUT OF RANGE & D		
STANNING RANGE FROM TO VII-28 OF-03-00		
FROM 700 VII-88 09-03-00 T0 700 IX 002 23-09-05		



A progressive vector diagram constructed from successive cumulative values of north-south and east-west July 28 through September 3, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same components of current velocity from records obtained at 10-minute intervals over 37-day period during as at this location.

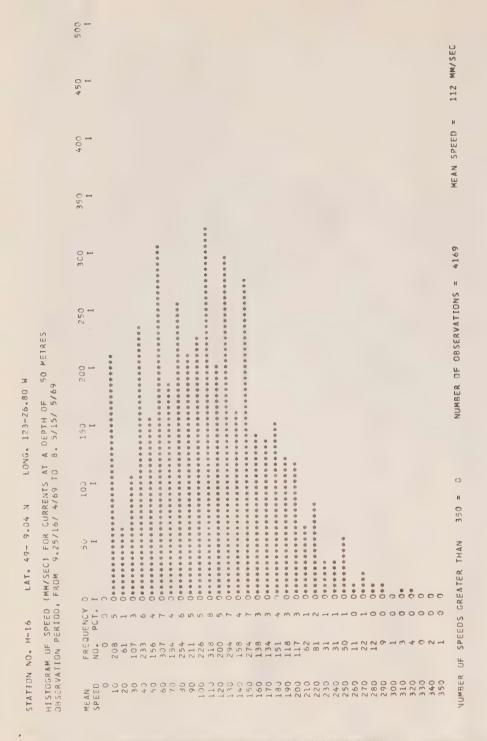


FIG. 7A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

HISTUGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 9.25/16/ 4/69 TO 8. 5/15/ 5/69

MEAN	FREQU	ENCY	9 50 100 150 200 250 300 350 400 450 500
DIR.		PCT.	730
0	63	2	
5	106	3	000000000000000000000000000000000000000
10	130	3	()************************************
15	118	3	0****************
20	218	5	0
25	176	. 4	0******************************
30	169	4	0*********************
35	132	3	0********************
40	120	3	0
45	153	4	0********************
50	137	3	0
55	119	3	0
60	123	3	0======================================
65	132	3	0***************
70	100	2	0***************
75	93	2	0*************
80	95	2	000000000000000000000000000000000000000
95	90	2	0************
90	104	2	0*************
95	111	3	000000000000000000000000000000000000000
100	89	2	000000000000000000
105	96	2	0======================================
110	124	3	000000000000000000000000000000000000000
115	95	2	0***********
120	148	4	000000000000000000000000000000000000000
125	128	3	000000000000000000000000000000000000000
130	141	3	00***********************
135	147	4	0**********************
140	105	3	0****************
145	95	2	0*****************
150	66	2	0*******
155	56	1	00*********
160	47	1	0******
165	37	1	Ossesses
170	29		Openen
175	20	0.	
180	17	0	0***
185	11	0	Obe
190	10	0	Ose
195	10	0	O=*
200	8	ő	
205	8	0	000
210	5	0	0*
215	5	o	0*
220	4	ő	0*
225	4	Ö	0*
230	10	Ö) ()**
235	11	Ö)++
240	4	ő	0*
245	6	0	0*
250	4	0	0*
255	0	0	
260	.3	0	0*
265	3	0	0*
270	4	0	0*
275	2 -	0	0
280	3	0	0*
285	1	0	0
290	4	0	0*
295	3	0	
300	4	0	
305	7	0	
310	4	0	
315	6	0	
320	6	0	
325	8		0**
330		0	
335	-3		0.
340	. 12		0**
345	7		0*
350	21	1	0****
355	31	1	

FIG. 7B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969.

NUMBER OF OBSERVATIONS = 4169

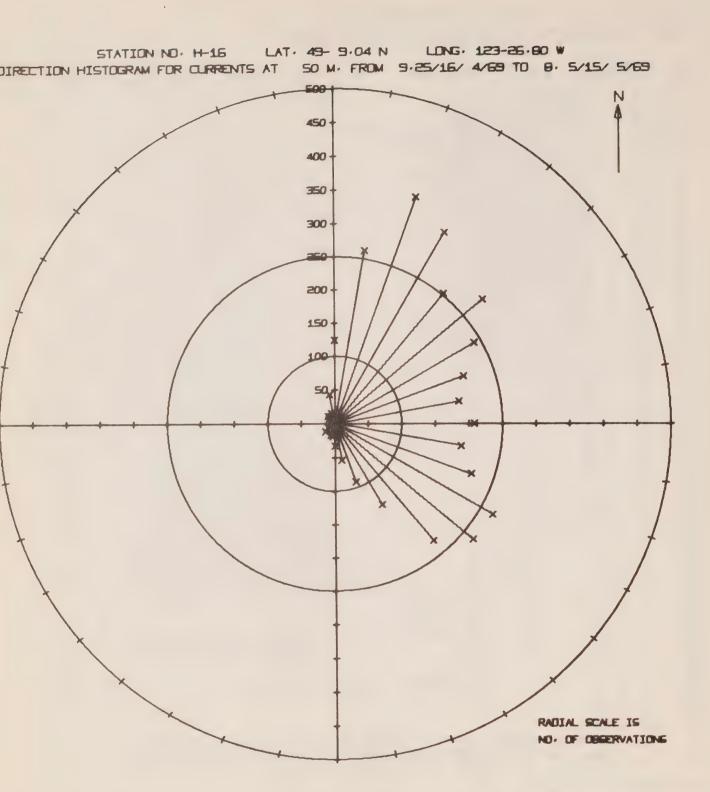
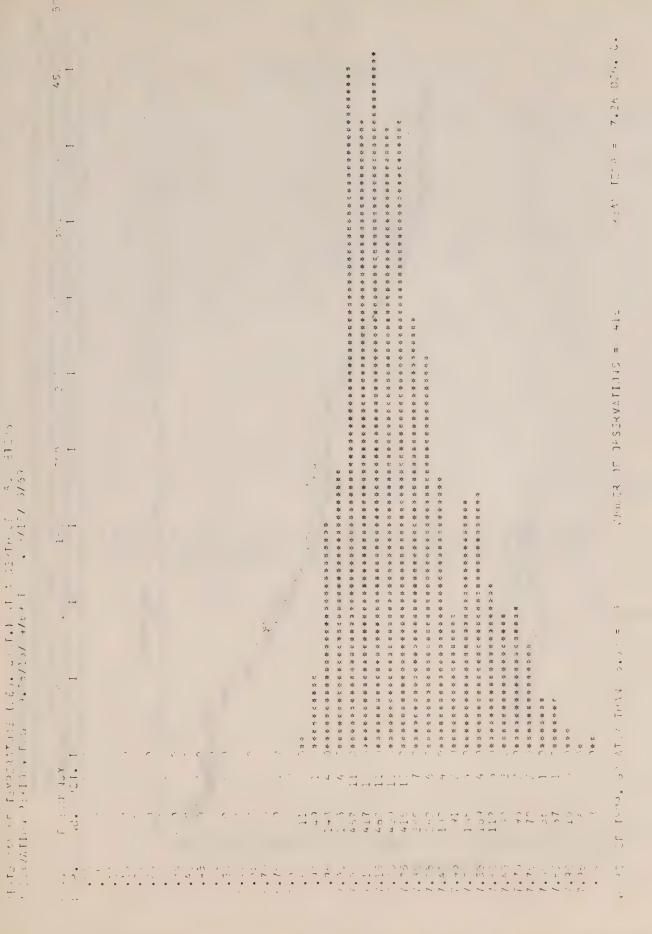
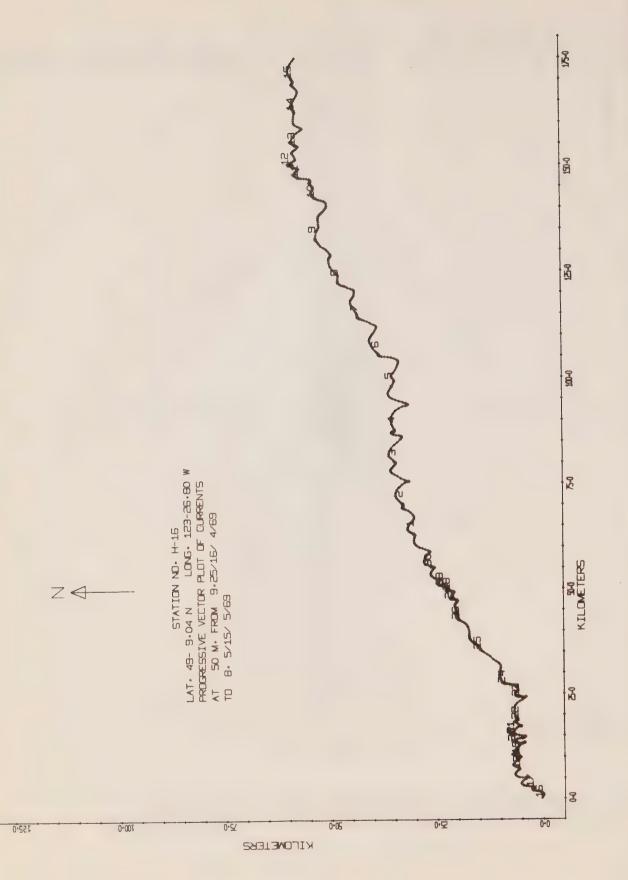


FIG. 7c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969.



G. 7p. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINE



components of current veloctiy from records obtained at 10-minute intervals over 29-day period during April 16 through May 15, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same A progressive vector diagram constructed from successive cumulative values of north-south and east-west as at this location.

Fig. 7e.

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

HISTOGRAM OF SPEED (MM/SEC) FUR CURRENTS AT A DEPTH OF 50 METRES JESCRYATION PERIOD, FROM 10.35/15/ 5/69 TO 7.55/18/ 6/69

MLAN	FREGU	ENCY	0 .	50 %	103	150	200	250	300	350	400	450	500
SPEED	NÚ.			I	1	1	I	1	I	1	1	1	500
J	0	J)						-	-	•	•	
10	230	5)*****	******	******		********						
20	78	2	7 * * * * *		*								
30	93	2	0****		***								
40	263	5	0 * * * * *	*****	******		********	********					
50	202	4		******	*****		*****						
60	3 3 1	7	0 * * * * * *	* * * * * * * * *	*****		******						
70	234	5	J*****	*****	*****		*****	***					
80	368	8	O*****	******	******		********	*********	********	********	•		
90	207	5	0 *****	******	******		********	*******					
100	256	5	0****	******	******	* * * * * * * * * * *	*******	******					
11J	408	8	0 * * * * * *	******	******	• • • • • • • • • •	******	• • • • • • • • • • •	*********		*******		
120	254	5	0 * * * * *	******	******	*******	******	******					
130	315	6	0 *****	******	******		*******	*********	********				
140	199	4	3*****	*******	******		*****						
150	267	5	0	********	******	*********	*******	********					
160	164	3	0 *** * * *	*******	******	********							
170	173	4	0 *****	******	******	*******	**						
180	182	4	0 *****	*******	*****	********	***						
190	91	2		*******									
200	122	2	0 *****		*****								
210	60	1	O*****										
220	75	2	-	******									
230	41	I											
240	34	I	0*****										
250	47	1	0 ****										
260	33	1	0****										
270	35	1	0****	•									
280	19	Ü											
290	16	0	0 * * *										
300	6	0	0.0										
310	7	O	0 *										
320	8	Ú											
330 340	6	0	0*										
	5	Ú O	0#										
350	1	.)	0										
NUMBER	OF SPEE	D\$ G	REATER T	'HAN 350	= 0	NUM	BER OF OBS	ERVATIONS :	= 4883	MEA	N SPEED =	113 MM/S	EC

FIG. 8A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MAY 15 THROUGH JUNE 18, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

STATION NO. H-16 LAT. 49- 9.04 N

LAT. 49- 9.04 N LONG. 123-26.80 W

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 10.35/15/ 5/69 TO 7.55/18/ 6/69

MEAN	50501	IC NIC V	າ 50	100	150	200	250	300	250	400	480	500
DIR.	FREQU NO.	PCT.		155	1	1	250 1	1	350 I	400 I	- 450 I	500 I
U	32		() * * * * *									
, 5	31	1) *****									
15 15	51 70	1) • • • • • • • • • • • • • • • • • • •									
25	134	3) *********		****							
25	156	خ) * * * * * * * * * * * *									
3.0	122	2	0******									
35 47	133	2	1000000000000									
45	95	2	9******									
50	7.0	1	0									
50	105	2	() * * * * * * * * * * *									
1	1.3	-										
55 7u	137	3	() * * * * * * * * * * * * * * *									
75	118	2)********									
್ ್	132	3	3*********									
85	113	2	U * * * * * * * * * * * * * * * * * * *									
9C 95	139 139	3	0									
*00	149	3	()*****									
105	120	2	J * * * * * * * * * * * * * * * * * * *									
110	154	3	0 *********									
115	144	3										
125	193	4	0									
130	202	4	2 *** * * * * * * * * * * * * * * * * *									
135	183	4	0 ********									
40 145	186	4	0									
150	183	4	() * * * * * * * * * * * * * * * * * * *			••••						
155	126	3	0 *** * * * * * * * * *									
160	102	2	0	******								
165	90	2	0									
170 175	61 56	1	0 *** *** *** ***	•								
180	35	î	0 *****									
185	32	1	0 * * * * *									
190	41	1	0*****									
195 200	2 7 30	1	0 * * * * *									
235	35	1	0******									
210	22	0	0****									
215	19	Û	0 * * * *									
225 225	19	0	0 ***									
230	11	ŭ	0 * *									
235	15	0	0 * * *									
240	7	Ú	0.0									
245 250	8	0	0 * *									
255	10	C	0**									
260	1	0	2									
265 270	5 2	0	0 *									
275	5	0	0*									
280	2	0	0									
295	9	0	0**									
290 295	1 2	0	0									
300	5	Ü	0.									
305	7	0	0*									
310	4	0	0+									
315 320	2	0	0									
325	4	0	0+									
330	4	0	0*									
335	6	0	0.									
340 345	9 17	0	0 * * *									
350	20	0	0 • • • •									
355	32	1	0 *****									

NUMBER OF OBSERVATIONS = 4883

FIG. 8B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MAY 15 THROUGH JUNE 18, 1969.

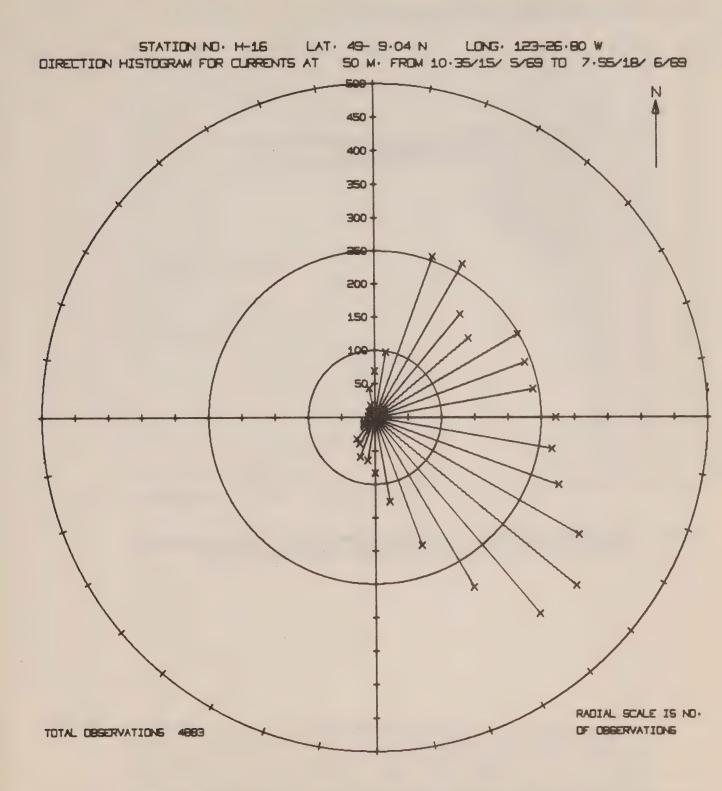


FIG. 8c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MAY 15 THROUGH JUNE 18, 1969.

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS JOSERVATION PERIOD, FROM 10.35/15/ 5/69 TO 7.55/18/ 6/69

	5050	110 BIZ W	0 100	200	300	400	500	600 7	00 . 800	900	1000
MEAN TEMP.	NO.	UENCY PCT.		1	1	1	I		1 1	1	I
7.00	0	0)	4	•	•	•	• `	• •	•	•
7.05	0		C								
7.10	3	š	0								
7.15	Ó	6)								
7.20	9	3	2.								
7.25			0 * * * *								
7.30	45 58	1) * * * * * *								
7.35	251	5	0								
1.40	/ 653	13	0******								
7.45	400	12	0								
7.50	547	11	()								
7.55	244	5	7								
7.60	172	4	1								
7.65	189	4	7*******								
7.73	213	4	0								
7.75	250	5	0								
7.80	227	5									
7.85	193	4	0								
7.90	204	4	0								
7.95	149	3	7								
8.30	164	3	0 *** * * * * * * * * * * * * * * * * *								
5.25	97	ž	0 ********								
0.10	65	1	0 ******								
9.15	72	1	0 *** * * * *								
d.20	35	2	3								
8.25	76	2	0 *** * * * * *								
8.30	89	4	0 * * * * * * * * *								
9.35	85	2	0								
8.40	74	2	0 *** * * *								
8.45	30	1	0 * * *								
8.50	46	1	0++++								
6.55	31	1	0***								
8.60	33	1	0 * * *								
0.65	19	0	0 * *								
8.70	9)	0*								
8.75	7	J	0#								
8.80	12	J	0*								
8.85	12	U	0 *								
8.90	15	0	0**								
8.95	13)	0 *								
9.00	18	J	0 * *								
9.15	13	U	0 *								
9.10	6	0	0*								
₹.15	1	J	0								
NUMBER	OF TEM	IP. GR	EATER THAN 9.15	5 * 0	NUMBER O	F DBSERVA	TIONS =	4883	MEAN TEMP #	7.74 DEG. C.	

FIG. 8D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MAY 15 THROUGH JUNE 18, 1969.

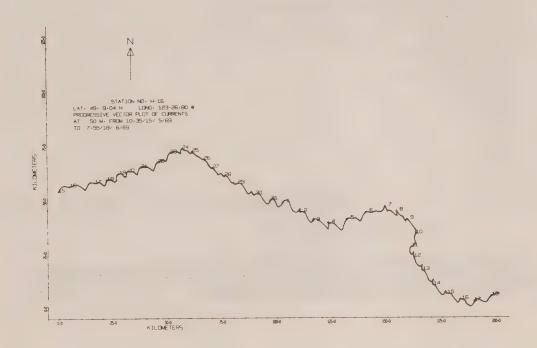


Fig. 8e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 34-day period during May 15 through June 18, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

STATIJN NO. H-16 LAT. 49- 9.J4 N LONG. 123-26.80 W

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DISSERVATION PERIOD, FROM 10.55/18/ 5/69 TO 10. 5/10/ 7/69

MEGN		UT NO Y		100	150	200	250	300	350	400	450	500
iP CEU		PCT.		1	1	I	I	I	1	I	1	1
J	J.	9)									
10	16.			**********	• • • • • • • • •							
20	91	3	() * * * * * * * * * * * *	*****								
30	97	3	**********	******								
45	240	7	()*********				******					
	100)	**********	**********	• • • • • • • • • •	•						
,	~ 75	1	100000000000000000000000000000000000000				• • • • • • • • • • • •	,				
7	17 -					•						
10	- 4,4	d	()				• • • • • • • • • • •				•	
15	10	,	*********									
-	251	ン	3									
. 1												
. ? .	102	**										
146	51	3										
146	155	2	0									
150	315	,	.)									
1/0	76	ź	0									
_ BU	98	3	() * * * * * * * * * * * *									
190	60	2	0*******									
200	74	2	() * * * * * * * * * * * * *									
210	38	1)******									
220	49	2	()********									
230	33	1	()*****									
24.1	16	1	^) * * *									
25)	15	6,	7***									
. 60	1.7	1	() * * *									
- 70	11	IJ	0**									
230	7	O.	0 *									
290	1	Ç	0									
NUMBER	UF SPE	EUS G	REATER THAN	290 = J	NUM	BER OF OBS	SERVATIONS =	3165	MEA	N SPEED =	101 MM/SE	:c

FIG. 9A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

STATION NO. H-16 LAT. 49- 9.34 N . LONG. 123-26.80 W

HISTORAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES DESCRIVATION PERIOD, FRUM 10.55/187 6/69 TO 10. 5/10/ 7/69

018.	PREQUENT	JY 7 2) T• I I	40, 60	80 · 100	120 " 140 160	180 I	20
	27	<u> </u>				•	
5	23						
10	14	j)******					
15 -		[]******					
25)****					
15		0 0 0 0 0 0 0 0					
30) /****					
35		0 0******					
43							
45		is Ceeee					
5 u	12)					
50	1 6	1)*******		·			
65)******					
7.5	16	J*******		The second of th			
75	13						
80	9.1						
85	20)*******					
90])*********					
15			•				
100	. 39	1)*********	*****				
105 .	. 25	(***********					
110	34		* * * *				
115	29		* *				
120.	43			. * * *			
125.	41		*****				
.30		1					
135		5 O************************************		~			
140		er ,	*******				
145			*******				
150	77		**********				
155		5 0*********		******			
166			******				
105			* * * * * * * * * * * * * * * * * * * *		*******		
175			*****		*******		
_86			****************	**********	•		
185		•	********				
. 10			*********				
195				****			
٠ رُوْءِ							
2 5	()		*******				
210			* * * * * * * * * * * * * * * *				
215	59	2 - (* * * * * * * * * * * * * * * * * * * *				
220	57	5 ()************************************	*****				
2.25	62						
230	60	2	******				
2351			*****				
443		<u>.</u> ()**********					
245							
250	36])*********					
255							
260							
15							
(65	57] ()************************************					
270	. 7						
270 275							
270 275 280	30	1)**********					
270 275 280 285	30 36	1	****				
270 275 280 285 240	30 36 41	1	* * * * *				
270 275 280 285 270 295	30 36 41 46	1	* * * * * * * * * * * * * * * * * * *				
270 275 280 285 230 295 300	30 36 41 45 49	1					
270 275 280 285 290 295 300 305	30 36 41 45 49 50	1	* * * * * * * * * * * * * * * * * * *				
270 275 280 285 230 295 300 305 310	30 36 41 45 49 50	1	* * * * * * * * * * * * * * * * * * *				
270 275 280 285 240 295 300 305 310 315	30 36 41 45 49 50 40	1	* * * * * * * * * * * * * * * * * * *				
270 275 280 285 230 295 300 305 310	30 36 41 45 49 50 40	1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				
270 275 280 265 240 295 300 305 310 315 320	30 36 41 45 49 50 40 41 63	1					
270 275 280 285 290 295 300 305 310 315 320 325	30 36 41 45 49 50 40 41 63 63	1					
270 275 280 285 240 295 300 305 310 315 320 325 330	30 36 41 45 49 50 41 63 63 63						
270 275 280 285 295 300 305 310 315 320 335	30 36 41 45 49 50 41 63 63 63 7 7						
270 275 280 295 300 305 315 320 325 335 340	30 36 41 45 49 50 40 41 63 63 63 77 36 27						

FIG. 9B A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969.

NUMPER OF URSERVATIONS = 3165

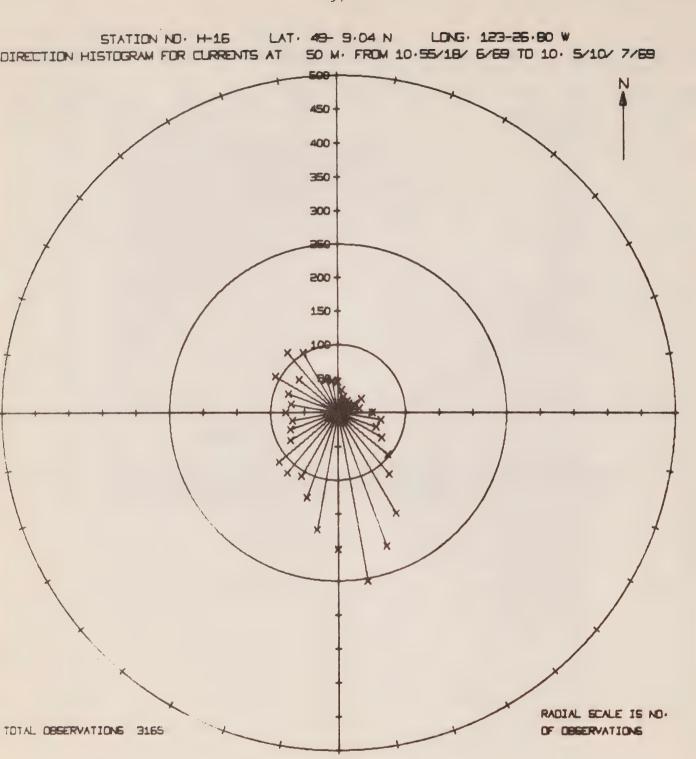


FIG. 9c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969.

9

STATI N 40. H-16	LAF. 49- 9.34 N	LUNG. 123-26.80	W
HINTURRAM OF TEMPERA DISTRUCTION PERIOD.	TURE (DEG. CENT.) AT FROM 10.55/18/ 5/09		

4.07	FREQU			() J	150	200	250	300	350	400	450	500
TEMP.		Pul.		I	I	I	I	I	ī	1	1	1
10.70	7		-d									
10 15	3		1)#									
5.12	*		0*									
1015)) ***									
8.25	15 19)	(.***									
	7 t	5	******	* *								
1.35	112	4)*********									
0.40	200	0										
0.45	104	5										
0.00	244	٤					*****					
3.55	238	Ö)********	********	******	********	****					
8.60	173	5		*******	*******	**						
0.65	207	7	O**********									
0.10	235	7	5**********				****					
8.75	35	3	`,***********	* * * *								
0.80	113	4) *********		4							
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1.05	7	- Ô	1)#									
2.70	3	-,)*									

FIG. 9D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969.

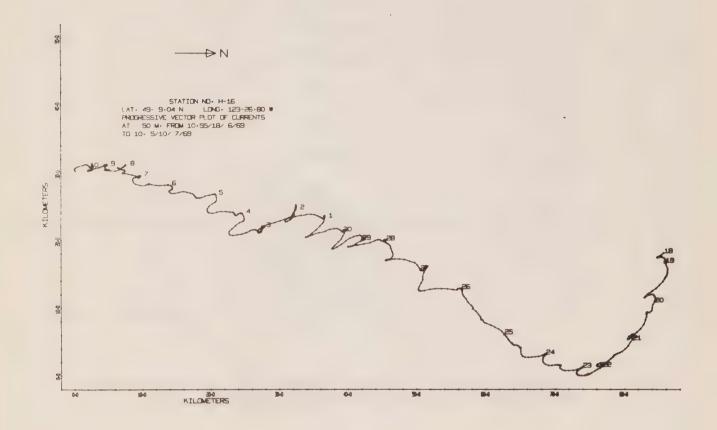


Fig. 9e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 22-day period during June 18 through July 10, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

JTATE 4 NO. H-16 LAT. 49- 9.74 N LUNG. 123-26.80 W

015TOGRAM OF 50220 (MM/S2C) FOR CURRENTS AT A DEPTH OF 50 METRES UNSCRIVATION POLITOR, FROM 13. 5/10/ 7/69 TO 13.11/28/ 8/69

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150	336	4			******							
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230	122	-)********									
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223	32	î										
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WOM FER E	DE SPE	208 31	KEATER THAN	330 = 0	NUME	BER OF UBSE	RVATIONS :	= 7060	MEAN	SPEED =	96 MM/SE	С

FIG. 10A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH AUGUST 28, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

STATILIN NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES DISTRIVATION PERIOD, FROM 13. 5/10/ 7/60 TO 13.11/28/ 8/69

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63	131	1										
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1.75	95	1	·)*********									
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120	159	2	********									
125	234	?	,**********									
130	161	2	Ú*****									
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210	70	ī)********									
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215	75 87	1	· · · · · · · · · · · · · · · · · · ·									
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NUMBER OF OBSCRVATIONS = 7060

FIG. 10B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH AUGUST 28, 1969.

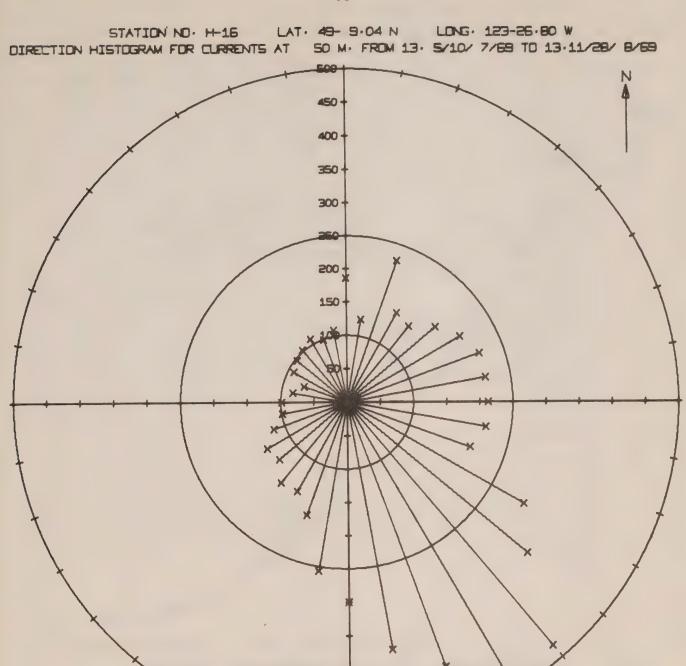


FIG. 10c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH AUGUST 28, 1969.

TOTAL DESERVATIONS 7060

RADIAL SCALE IS NO-OF DBGERVATIONS STAILIN 40. H-16 LAI. 49- 9.14 N LONG. 123-26.80 W

11.TO RAM OF T MPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS
11. AVAILOR P. 21.0., FROM 13. 5/10/ 7/69 TO 13.11/28/ 8/69

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41.415,	ा १.अस	·	ATER THAN 10.30	= 3	NUMBER	OF UBSERVA	TIONS = 7	7060	MEAN	TEMP = 9.	25 DEG. C	•

FIG. 10D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 20-MINUTE INTERVALS OVER 49-DAY PERIOD DURING JULY 10 THROUGH AUGUST 28, 1969.

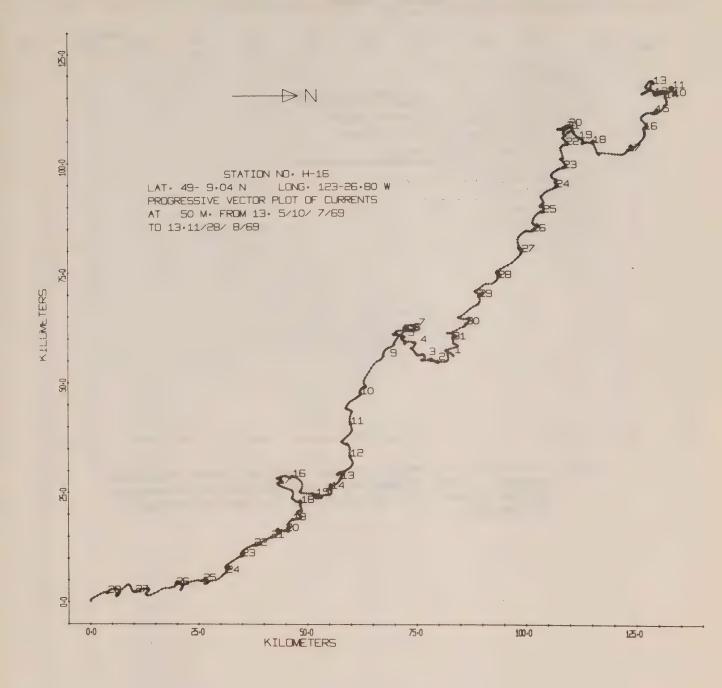


Fig. 10e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 49-day period during July 10 through August 28, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

11.11.4 10. H-1 LAT. 49- 9.34 N LONG. 123-26.80 W

FISTUMAAM OF SR D (MMM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES | 508 VARIO & PORTO), FROM 15.46/28/ 8/60 TO 11.57/18/ 9/69

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FIG. 11a. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES
DUSTRYATION PURILUD, FROM 15.45/24/ 8/69 TO 11.57/18/ 9/69

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NUMBER OF OBSERVATIONS = 3004

FIG. 11B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

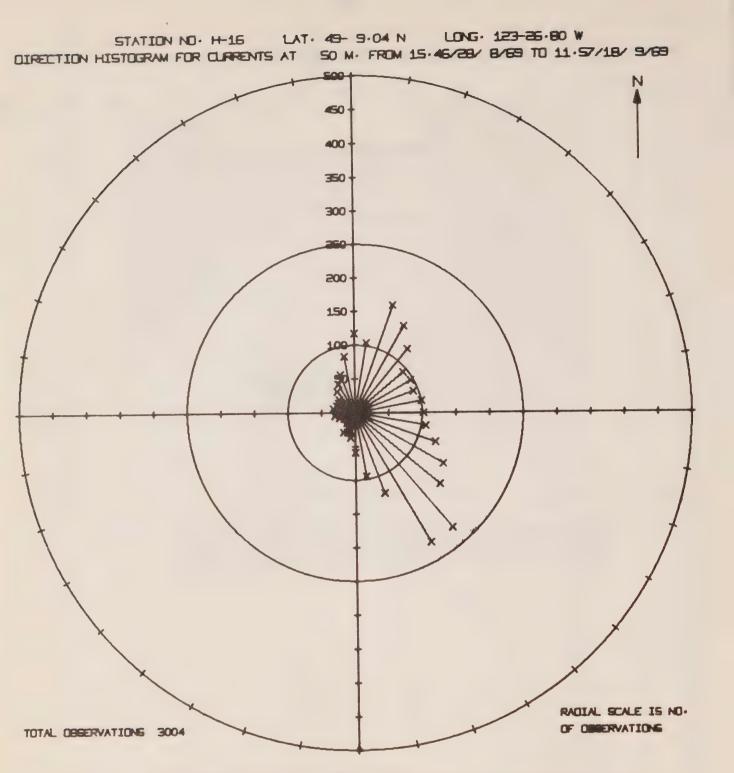


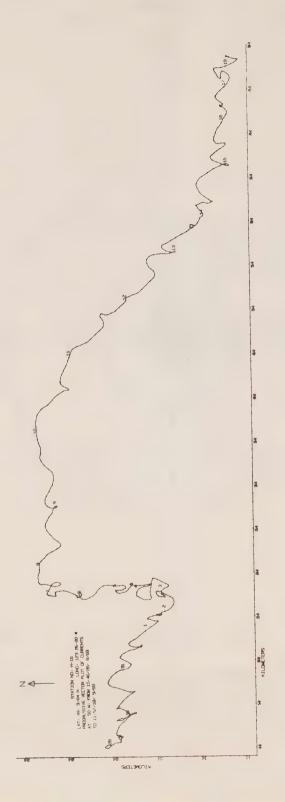
FIG. 11c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

STATION NO. H-16 LAT. 49- 9.04 N LUNG. 123-26.80 W

HISTOLRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS DESERVATION PERIOD, FROM 15.46/28/ 8/69 TO 11.57/18/ 9/69

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9.25	179	Э) W W	********			***						
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9.35 9.40	114	4		******	********								
9.45	169	6) * *	********		********	*						
9.50 9.55	88 148	3 5	0**	*****									
9.60 9.65	202	7)**	*****			******						
9.75	121	4)**	******									
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NUMBER	UF TEM	1P. 32	EATE	R THAN 12.3	p = 1	NUMB	SER OF OBSE	RVATIONS =	3004	MEAN	TEMP = 9	.24 DEG. C	•

FIG. 11D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.



components of current velocity from records obtained at 10-minute intervals over 21-day period during August 28 through September 18, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the A progressive vector diagram constructed from successive cumulative values of north-south and east-west same as at this location.

Fig. 11e.

500

STATION NO. H-16 LAT. 49- 9.34 N LONG. 123-26.86 W

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 14.37/18/ 9/69 TO 8.3/16/10/69

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370		0 2										
380		0 0										
390		0 0										
420		2 3										
470	-	, ,										

FIG. 12A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

DISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 14.37/18/ 9/69 TO 8. 3/16/10/69

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60	126	3	O ************									
65	107	3	O*********									
70	175	3	J**********									
75	111	- 1										
30 85	127	3	O									
30	141	4)**********									
15	126	3	.)									
100	106	3	-									
1)5	138	3	^*********									
110	104	3	^*·********									
115	128	3	·									
120	130	3	0 *********									
125	145	4	O*********									
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220	7	0	0***									
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235	3	0	0 * *									
240	1	0	0.*									
240	3	0	0 * *									
240 245 250	3 2	0	0## C#									
240 245 250 255	3 2 1	0 0	0 * * 0 *									
240 245 250 255 260	3 2 1 2	0 0 0	0## C#									
40 45 50 255 260	3 2 1	0 0	0** 0* 0*									
245 250 255 260 265 270	3 2 1 2 2	0 0 0 0	0** 0* 0* 0*									
240 245 255 260 265 270 275 280	3 2 1 2 2 5	0000000	0** 0* 0* 0* 0*									
245 255 260 265 270 275 280	3 2 1 2 2 5 3 10 3	000000000	(* * * * * * * * * * * * * * * * * * *									
245 255 255 260 265 275 275 280 285	3 2 1 2 2 5 3 10 3	00000000000	0 * * * * * * * * * * * * * * * * * * *									
440 445 550 255 260 265 270 275 280 285 290	3 2 1 2 2 5 3 10 3 11 6	000000000000	(* * * * * * * * * * * * * * * * * * *									
40 45 50 55 60 65 70 75 80 85 995	3 2 1 2 2 5 3 10 3 11 6	0000000000000	0 = = 0 = 0 = 0 = 0 = 0 = 0 = 0 = 0 = 0									
40 45 50 55 60 65 70 75 80 85 995 900 905	3 2 1 2 2 5 3 10 3 11 6	000000000000000000000000000000000000000	(* *)									
40 45 50 55 60 66 77 78 88 88 99 90 90 91 91 91	3 2 1 2 2 5 3 10 3 11 6 16	0000000000000000	(* * * * * * * * * * * * * * * * * * *									
240 245 250 255 260 270 275 280 285 290 295 305 310	3 2 1 2 2 5 3 10 3 11 6 40 6	0000000000000000	(* * * * * * * * * * * * * * * * * * *									
240 245 250 255 2665 276 280 285 290 295 305 310 315	3 2 1 2 2 5 3 10 3 11 6 4 6 16 19 20	000000000000000000000000000000000000000	(
440 445 255 2660 276 276 2885 2990 295 300 301 301 301 302 302 303 303 303 303 303 303 303 303	3 2 1 2 2 5 3 10 3 11 6 16 9 20 24	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1	(* * * * * * * * * * * * * * * * * * *									
240 245 250 266 266 266 275 280 295 300 295 300 305 310 3323 3323 3323	3 2 1 2 2 5 3 10 3 11 6 4 6 16 19 20	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(
245 245 2255 2266 2265 2275 2285 2295 2295 2390 2390 2390 2390 2390 2390 2390 2390	3 2 1 2 2 5 3 10 3 11 6 40 6 16 9 20 24 12	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 * * C * C * C * C * C * C * C * C * C									
240 245 2255 2266 2275 2285 2270 2305 2305 33120 3325 3330 3345	3 2 1 2 2 5 5 3 10 3 11 6 40 6 20 24 12 18	000000000000000000000000000000000000000	(
240 245 255 260 267 267 275 280 280 295 295 295 3315 3315 3335 3345 3350	3 2 1 2 2 5 3 10 3 11 6 40 6 16 9 20 24 12 18 11 15		(
40505066775088995050505050505050505050505050505050	3 2 1 2 2 5 3 10 3 11 6 6 6 16 9 22 18 11 15		(

FIG. 12B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

STATION NO. H-16 LAT. 48- 9.04 N LONG. 123-25.80 W
DIRECTION HISTOGRAM FOR CLRRENTS AT 50 M. FROM 14.37/18/ 9/68 TO 8. 3/16/10/68

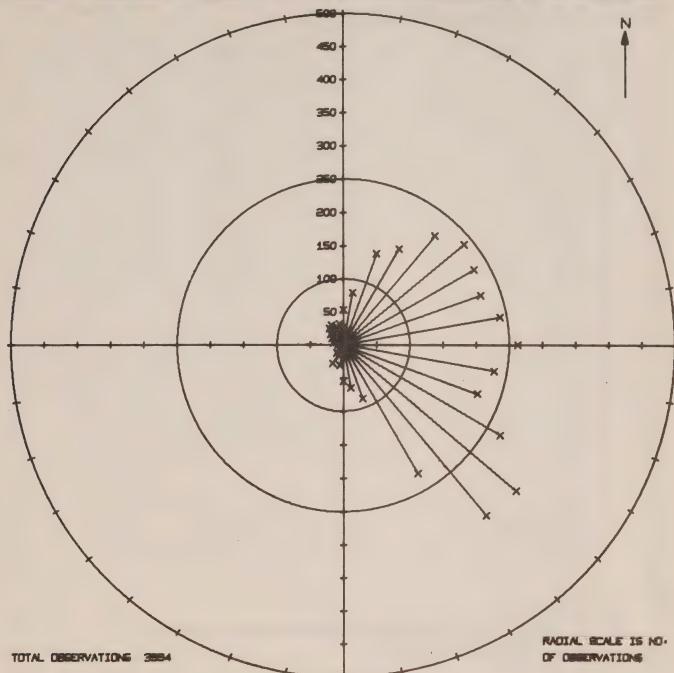


FIG. 12c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16. 1969.

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

HISTUGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS DESERVATION PERIOD, FROM 14.37/18/ 9/69 TO 8. 3/16/10/69

1LAN TEMP.	FREQU Nu.	PCT.	0 200 400 I I I	600 I	800 I	1000 I	1200 I	· 1400	1600 I	1800 I	200
3.00	0	Ü	0								
3.1C	1		0								
3.20	0	Ú	2								
3.30	0	0	2								
3.40	0	0	2								
3.50	0	0	2								
3.60 3.70	0	0)								
3.80	0		ń								
3.70	0	,)	2								
4.00	Ö		0								
4.10	0	0	0								
4.20	0	0)								
4.30	0)	0								
4.40	0	0	1								
4 . 50	0	0	1								
4.60	2)	2								
4.70	0	0	C								
4.80	0	j	0								
4.30	0	0	0								
5.10	9	Ü	5								
5.10	0	0	n								
5.30	ņ	Ü	ń								
5.40	0	Ō	2								
5.50	()	J)								
5.60	0	3	0								
5.70	0	0	ŋ								
5.30	0	0	0								
5.90	0)	0								
6.00	1	0	0								
6.10	0	Ú	0								
5.20	0	0	0								
6.30	0	Ú	0								
6.50	0	0	0								
6.50	0	C	0								
6.70	n	0	ó								
6.80	0	Ö	0								
6.90	0	0	Û								
7.00	ņ	C	0								
7:10	0	0	0								
7.20	0	0	n								
7.30	0	0	0								
7 - 40	0	0	0								
7.50	0	U	0								
7.50	0	0	0								
7.70	0	0	0								
7.80	0	0)								
8.00	0	0	0								
9.10	o o	Ĵ	0								
B.20	0	0	0								
8.30	0	o o	Ō								
8.40	0	0	7								
8.50	1	0	0								
8.60	64	2	0***								
8.70	156	4	0 * * * * * * *								
8.90	242	6	0 * * * * * * * * * * * * * * * * * * *								
8.90	1467		0 * * * * * * * * * * * * * * * * * * *	******		*******					
9.00	656	16)*************************************								
9.10	480 650		0								
9.30	203		0								
9.40	39	1									
9.50	22	1									
4.60	2	0	0								

FIG. 12D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

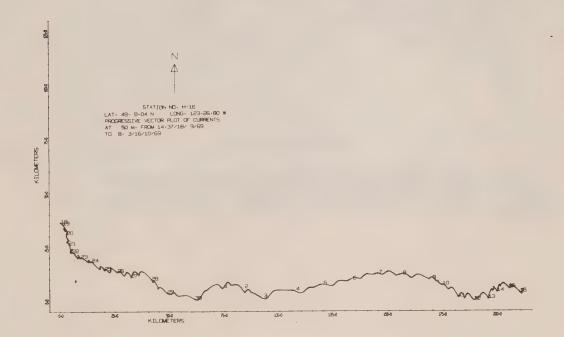


Fig. 12e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 28-day period during September 18 through October 16, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

HISTOURAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PURIOD, FROM 11. 6/16/10/69 TO 10.59/25/11/69

MEAN		DUENCY PCT.		100	150	200	250	300 I	350 I	400	450	500
)PE-11	, nu .	Ü.		1	1	*	4	*		1	1	1
1.	4.5	7										
9	146	3	0 **********									
30	157	3			******							
40	392	7) * * * * * * * * * * * * *				********					
50	282	r-j	***********	********			*********					
60	442	d					******		******		*****	
7.)	257	4	/*********	******		• • • • • • • • •	******					
36	477	Ħ) * * * * * * * * * * * * * * * * * * *	*********		********	• • • • • • • • • •	• • • • • • • • • •	• • • • • • • • • • •	• • • • • • • • • •	• • • • • • • • • •	
30	313	*1					* * * * * * * * * * *	• • • • • • • • • •				
1 13	9 % 5	C		********	********		• • • • • • • • • •		*****			
11.	4. 2.	7	***********	*********	*******	********		*********	•••••	********	•	
. ?'.	25 4	†					******					
131	4 19	7						********	*********	*******		
150	2 j 1	4			* * * * * * * * * *		* * * * * * * * * * * * * * * * * * *					
150 160	161	3	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~		• • • • • • • • • •	••••••	********	• • • • • • •				
170	145	3 7										
130	1.75	2	`*********									
190	33	1) * * * * * * * * * * * * *									
20.	1.7	5										
210	6.7	1) * * * * * * * * * * * * * *									
220	57	1	. *********									
3	΄,		/***									
. 4.	1.2		****									
250	2.3		7*****									
26	2.1		****									
27,	2.1) * * * *									
* 4 *			E *									
6 15	2		0									
. MUEX	JE SPE)\$ 3	REATER THAN 2	290 = 2	NUM	HER OF OBS	ERVATIONS :	= 5762	. MEAI	N SPEED =	99 MM/SE	С

FIG. 13A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

574FTON NO. H-16 LAT. 49- 9.04 H LONG. 123-26.80 W

HISTOGRAM OF DIRECTION (DEC. TRUE) FOR CURRENTS AT A DEPTH OF SO METRES DISCRIATION PERIOD, FROM 11. 5/16/10/09 TO 10.59/25/11/69

MIAN PIR.	EKE NU.	MONOY.		150	200	250 1	300	350	400	450	500
)	125	2)**********		•	•	•	•	•		
D.	144	3)****************								
10	137	2									
15	170	3	~************								
20	235	4				• • •					
3.5	151	7									
35	119	2									
40	123	2									
45	137	2									
50	114	2	**************	* * *							
35	93										
0.	1.0		~***********								
63 7c	105	2		*							
75	138	2)*************	******							
3.3	127	2									
45	117	2		* *							
30	1.3	2	,	•							
95	94	1]								
1.30	134	2) * * * * * * * * * * * * * * * * * * *								
175 110	127 153	2	```								
115	167	3)************								
120	170	3									
125	171	ı									
13)	1:4	,	·)**************	*****	•						
135	131	.2									
140	103	2	·	E 0							
145	75	2	144444444444444								
150 133	.19 54	1									
140	57	1	S********								
163	52	î	^******								
175	5.7	1.	Osssesses								
175	4.2	1	0 *******								
147	56	1	.)*****								
145	41	1	2*****								
190	21	1	``*********								
1.75 2.70 -	27	. 0)****								
215	34	1	7*****								
210	3.8	ī	-								
215	29	1									
220	19	1)*****								
225	40	1	*)******								
230 235 .	34										
240	17	40	1000								
245	. 25	Ü)****								
250	2.1		0****								
255		Ų	3***								
260	2.3		0.000000								
265	15	Ú	0***								
270 275	24 19	ე კ	0****								
280	23	9	0****								
245	26	Ú)****								
270	31	1)*****								
295	37		O****								
300	5.3	_	0*****								
305	48	_	O								
319	24		O******								
315 . 320	33 47	1	1444444								
325	59	1	100000000000000000000000000000000000000								
330	63	î	-								
335	72	1	J**********								
340	49	1	O******								
345	63	1) **********								
35.) 355	05 71	1									

NUMBER OF DESCRIVATIONS = 5762

FIG. 13B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

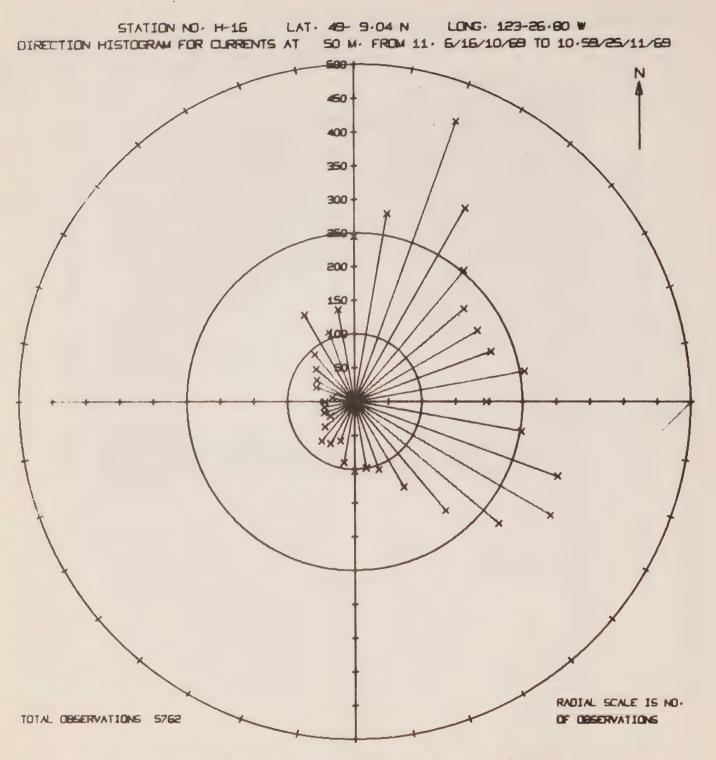


FIG. 13c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

STATIUN NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS JUSERVATION PERIOD, FROM 11. 6/16/10/69 TO 10.59/25/11/69

M_AN	FREGU	JENCY	0 200	400	600	900	1000	1200	1400	1600	1800	2000
TEMP.	NU.	PCT.		I	I	I	I	1	I I	1	I	1
00.00	1)	Ĵ	3									_
1.05	. 0	.)	7									
8.10	0	C	1									
5.15	0	U	9									
0.20	1)									
0.25	0	0)									
d.30	0	_	^									
5 - 35	0	Ü.	7									
8.40	0	Ų	7									
8.45	0	Ü	0									
4.50	e.	Ĵ.	9									
d.55	0	0	0									
A.60	O	Ü	9									
9.65	0	0	0									
5.70	0	C	0									
8.75	0	5	0									
8.30	0	- 2	C									
8.85	0	U	0									
8.90)	0	0									
8.75	41	1	0++									
9.00	666	12			• • • • • • • • • • •	•						
9.05	876	15	() * * * * * * * * * * * *		• • • • • • • • • • •							
9.10	931	16			• • • • • • • • • • • • • • • • • • •							
9.15	955	17										
9.20	1272	22	0						•			
9.25	867	15)****									
9.30	99		7****									
9.35	19	0	0									
9.40	13	3	·) •									
7.43	1 2	U	9*									

MEAN TEMP = 9.14 DEG. C.

FIG. 13D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

NUMBER OF TEMP. GREATER THAN 9.45 = 0 NUMBER OF OBSERVATIONS = 5762

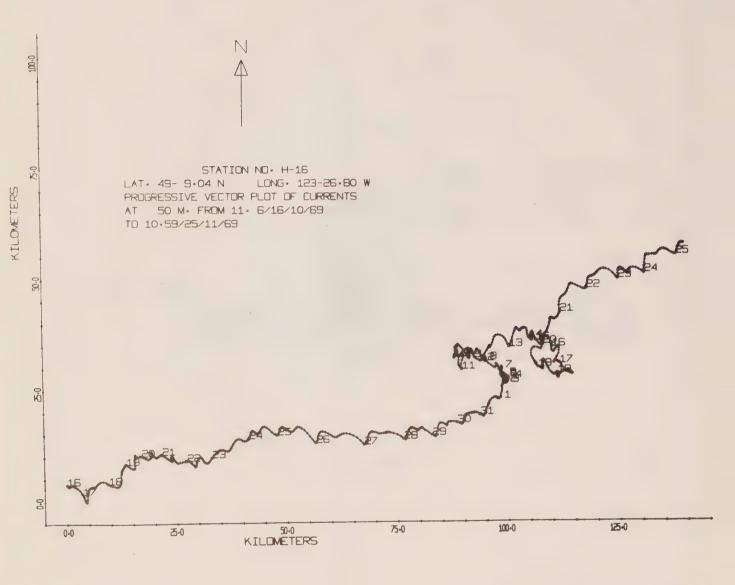


Fig. 13e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 40-day period during October 16 through November 25, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

DATAY WANAL MOTOR / SPEED		
BAR PLOT	FREQUENCY	CM/SEC
•	j	0.5
***************	1364	1.5
***********	1001	2.5
***********************	1735	3 • 5
***************	1817	4.5
******************	1791	5.5
**********************************	2465	6.5
************	3063	
***************************************		7.5
		8.5
	3016	9.5
***************************************	3050	10.5
889888888888888888888888888888888888888	2867	11.5
	2775	12.5
	2973	13.5
	2867	14.5
****	2519	15.5
*******************************	2401	16.5
***************************************	3005	17.5
****	1859	18.5
*************************	1863	19.5
************************	1819	20.5
***************************************	1643	
******************	1335	21.5
400000000000000000000000000000000000000		22.5
***************************************	1346	23.5
	1241	24.5
	1103	25.5
******************	1362	26.5
*********	664	27.5
*******	511	28.5
******	43 9	29.5
******	353	30.5
******	313	31.5
*****	272	32.5
****	162	33.5
****	143	34.5
***	156	35.5
	39	36.5
	29	37.5
•	10	38.5
	17	39.5
	1,	
	4	40+5
		41.5
	1	42.5
•	C	43.5
	į.	44.5
*	Ĵ	45+5
• Control of the cont	Õ	46+5
*	5	47.5
•	J	48.5
•	2	49.5
•	5	50.5
•	Č.	51.5
· ·		52.5
	ō	53.5
	· ·	
	~	54.5
	4	55.5

TOTAL NUMBER OF INPUT DATA # 60008 #WITH AVERAGE VALUE # 14:05 CM/SEC

NUMBER OF DATA OUT OF HANGE # 0

\$PANNING RANGE FROM 69- XI -25 15.07.00 TO 70- I -09 06.08.05

NUMBER OF NON+STANDARD RECORDS . ONLY OF THE CHECKSUM ERRORS . C

J88 END/ 15:45 APR 22,170

A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED FIG. 14A. AT 15-MINUTE INTERVALS OVER 45-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 9, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

Station H-16 40 metre depth

```
BAR PLB*

DATA/ NANAIMBIB7*2 / DIRECTION

Fig.

DATA/ DATA/ DATA/ DATA/

Fig.

DATA/ DATA/ DATA/

Fig.

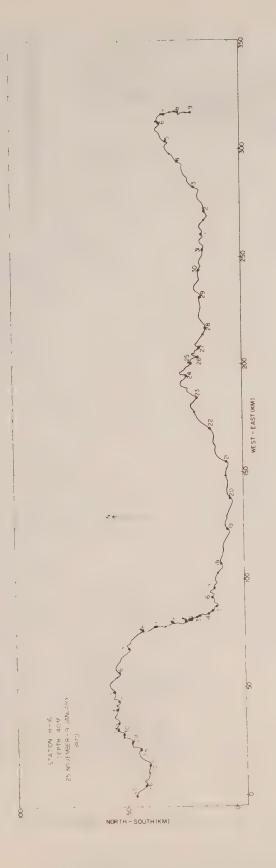
DATA/ DATA/ DATA/

Fig.

                                                                                                                                                                                                                                                                                                              DATA/ NANAIMBIST-2 / DIRECTION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           FAEGUENCY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 6993100
99316
99316
99316
99316
99316
99316
99316
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1927
1027
1043
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         : 9
                   17:17:13
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              184
                 TOTAL NUMBER OF INPUT DATA & 60008 #HITH AVERAGE VALUE & $13-36 DEGREES
                       NUMBER OF DATA BUT OF RANGE . 0
```

FIG. 14B. A HISTOGRAM OF DIRECTION ("TRUE), WITH CLASS INTERVAL OF 5", FROM RECORDS OBTAINED AT 15-MINUTE INTERVALS OVER 45-DAY PERIOD DURING HOVEMBER 25, 1969 THROUGH JANUARY 9, 1970.

Station H-16 40 metre depth



west components of current velocity form records obtained at 15-minute intervals over 45-day period during November 25, 1969 through January 9, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire area of the location of the instrument was A progressive vector diagram constructed from successive cumulative values of north-south and eastthe same as at this location.

Fig. 14c.

```
DATA/ NAMERS/2 / SPEED

FI

CATA/ NAMERS/2 / SPEED

FI

CA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            DATA/ NAM183/2 / SPEED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 PREQUENCY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      2018 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 3
                                              TOTAL NUMBER OF INPUT DATA # 56096 ##ITH AVERAGE VALUE # 13+34
                                              NUMBER OF CATA OUT OF PANSE + 22
                                              Station H-16
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     50 metre depth
                                                 NUMBER OF NON-STANDARD RECORDS . G-
NUMBER OF CHECKBUM ERRORS . D
                                                 J88 END/ 16168 SCT 07,170
```

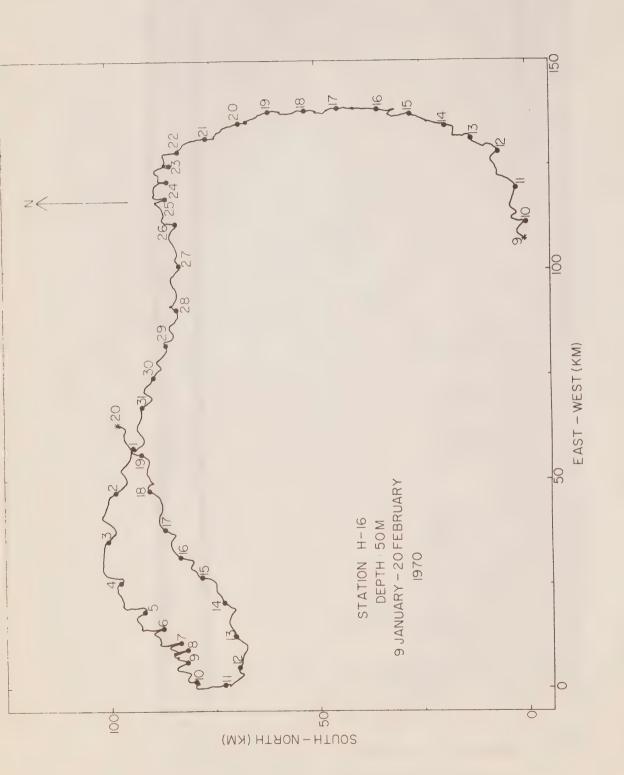
FIG. 15A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 15-MINUTE INTERVALS OVER 42-DAY PERIOD DURING JANUARY 9 THROUGH FEBRUARY 20, 1970. SPEED LESS THAN OR EQUAL 10 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

DATA/ NAM183/2 / DIRECTION		
BAR FLOT	FREQUENCY 744	DEGREES
D0000000000000000000000000000000000000	744 730	i
***************************************	1078	1
*************************	480 470	11
•••••••••••••••••••••••••••••••	558 475	17
***************************************	301 847	83
***************************************	1080	14 20 20 20 20 20 20 20 20 20 20 20 20 20
000000000000000000000000000000000000000	476	37
*******************	336	37
***************************************	391 375	45
************************	338 295	***
*****************************	482	51
***************************************	499 440	86
******************************	418	65
**************************************	416	68
*******************************	10R 377	76
***************************************	327 372	76
*****************	264	82
***************************************	514	8 h 8 7
***********	292 323 216	90
***************************************	314	96
***************************************	441 376	101
*****************************	374	101 104 107 110 113 115
***************************************	304	110
*************	298	115
••••••••	195	118
******************	209	126
***************************************	588	129
***************************************	236 232	135
800000000000000000000000000000000000000	191	138
***************************************	267	103
***************************************	181	149
***************************************	232	188
	523	158
***************************************	360	163
900000000000000000000000000000000000000	307	169
•••••••••••••••••••••••	363	178
*****************	301	177
***************************************	849	12.0.7 9 25 8 18.6 6 9 25 5 1 2 2 2 2 2 2 3 3 3 4 4 5 5 6 6 5 7 2 2 5 6 6 6 7 2 2 7 2 2 6 6 6 7 2 2 7 2 1 8 8 6 1 2 7 7 2 1 8 8 6 1 2 7 7 1 1 8 8 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
**************************************	460 476 486	188
*******************************	466	191
***************************************	384	188 191 192 197 200
\$	309	\$08
***************************************	303	208
***********************************	375 464 642	111
•••••••	380	21.7
•	349	512
**************************************	936	553
***************************************	446	231
000000000000000000000000000000000000000	918	534
***************************************	422 523	243
***************************************	416 275	2.00
••••••••••••••••••••••••••••••••••••••	Ç	580
***************************************	246 348	284
***************************************	258 397	299
***************************************	344	364
***************************************	128	208 208 208 21: 21: 21: 21: 21: 22: 22: 22: 23: 24: 24: 26: 26: 26: 26: 26: 27: 27: 27: 27: 27: 27: 27: 27: 27: 27
***************************************	995 971	273
000000000000000000000000000000000000000	874	278
000000000000000000000000000000000000000		281 284 287
***************************************	980 487 493	287 290
***************************************	327	270 291
***************************************	681 648 465	591
***************************************	495	301
***************************************	811	307
***************************************	627	311
***************************************	680 787	214
***************************************	880	383
400000000000000000000000000000000000000	402 585	384
••••••••••••••••••••••••••••••••••••••	633 535	331
••••••••••••••••••••••••••••••••••••••	668	335
**************************************	. 1843	36 C 36 C 36 C
***************************************	734	360
000000000000000000000000000000000000000	632 898	301
000000000000000000000000000000000000000	636	384 387
TOTAL NUMBER OF INPUT DATA D. 56098 SKITM AVERAGE VALUE 9 189:01 DEGREES		

Station H-16 50 metre depth

NUMBER OF DATA BUT OF RANGE .

SPANNING RANGE
FROM 70 = 1 =09 10.02.00
TB 70 = 11 =20 07.48.05



A progressive vector diagram constructed from successive cumulative values of north-south and east-west that would occur if the motion in the entire neighboring area of the location of the instrument was the components of current velocity from records obtained at 15-minute intervals over 42-day period during January 9 through February 20, 1970. The spatial scale corresponds to the displacement of the water same as at this location.

Fig. 15c.

STATION NO. H-16 LAT. 49- 9.34 N LONG. 123-26.80 W

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DISERVATION PURIOD, FROM 11.49/20/ 2/70 to 9.5/25/ 3/70

MEAN SPEED	· NO.		1 ' 1	200 I	300 I	400 I	500 I	000	700 I	1 008	900	1000 I
0	0	ξ										
10 20	163 58	2	O*********									
30	94	1 2	O * * * * * * * * * * * * * * * * * * *									
40	184	4	.)									
50	187	4	C++++++++++									
60	326	7	O******									
70	261	5) * * * * * * * * * * * * * * * * * * *		****							
80	564	11		*********			*****					
90	310	7	0********									
100	268	6										
110	374	8)********		******	****						
120	188	4	^********									
130	298	6	O********		*****							
140	158	3	C *******	****								
150	245	5	0*********		*							
160	183	4	()*********									
170	156	3	()********									
180	194	4										
190	85	2	()*******									
206	132	3	0*******	**								
210 220	71 70		()*******)******									
230	36	1	0 * * * *									
240	29)***									
250	47		2****									
260	20		O##									
270	28	1										
280	13		0*									
290	13	0										
300	2	Э	ລ									
310	2	5	C									
320	4	0	()									
330	1	0)									
340	4	0	0									
350	3		0									
360	4	2	0									
370	O O		0									
380	1	0	2									
40MBER	UF SPE	EDS G	REATER THAN	300 = '	NU	MBER OF OBS	ERVATIONS	= 4736	MEAI	N SPEED =	113 MM/SE	C

FIG. 16A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING FEBRUARY 20 THROUGH MARCH 25, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

STATION NO. H-16 LAT. 49- 9.04 N 10NG. 123-26.80 W

HISTUGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES INSCREVATION PERIOD, FROM 11.49/20/ 2/70 TO 9.5/25/ 3/70

MεΔN		UENCY		19	40	60	90	100	120	140	160	180	200	
UIR.	NO.	PC F.		I	I	I		I	I	1	I	I	I	
5	78 55	2					*****							
15	75	<u>.</u>	~*****											
15	5,8	1												
ΞĴ	115	1	*******						****					
> 5	110				*****			********	* *					
3.0	1.^	2		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,										
3.5	1.5													
\$-U	102	2	()*****						M. M.					
45 50	117	2							**				,	
55	68	- 1	()=======											
hu	80	5						•						
65	64	?	()******				*******							
70	7.3	2			*****		***							
7.5	73	2)*****				***							
,0	63	1	O * * * * * * * * * * * * * * * * * * *											
45	65	1	O******											
90 46	67 სქ	1	0											
100	o 5	2												
. 75	163	?												
130	133	2			******		*******	*******						
115	#2													
.20	103													
1.25	94					********								
130	49					* * * * * * * * * *								
135	82 25	2	0 ********											
140	52	1)*******					*****						
120	57	î	0******											
155	21	o o	0*******											
1:0	1.7	J												
165	3 3	1	O******											
170	4)	1	3*******											
175	49	1)*******											
120	47	1	**************************************											
135	55 41	1) # * * * * * * * * * * * * * * * * * *											
, 75	73	2				******	***							
200	60	1	J********											
205	74	2	()******				***							
210	64	1	0******											
215	59	1)*******			*****								
220	45	1	O*******											
225 230	47 60	1	0*****											
235	44	1	0*******											
240	38	1	()******											
245	35	1	U*******		***									
25,0	45	1												
.55	50	1												
260	53	1	.)*******											
245 270	55 71	1	0 * * * * * * * * * * *			****	***							
275	63	1				********								
280	47	î	(******											
285	52	1	0 ******											
230	46	1												
2 9 5	64	1)******											
300	61	1												
315	48	1)*****											
1.0 31.5	47	1	O*******											
320	34	1)*****											
325	44	1	0++++++											
330	55)******			*******								
3 3 5	50	1	0 *******											
340	54	1	/) * * * * * * * * *											
345	49	1	0											
350	30)		0******											
355	79	2	0******		*******	*******	******							

NUMBER OF OBSERVATIONS = 4736

FIG. 16B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING FEBRUARY 20 THROUGH MARCH 25, 1970.

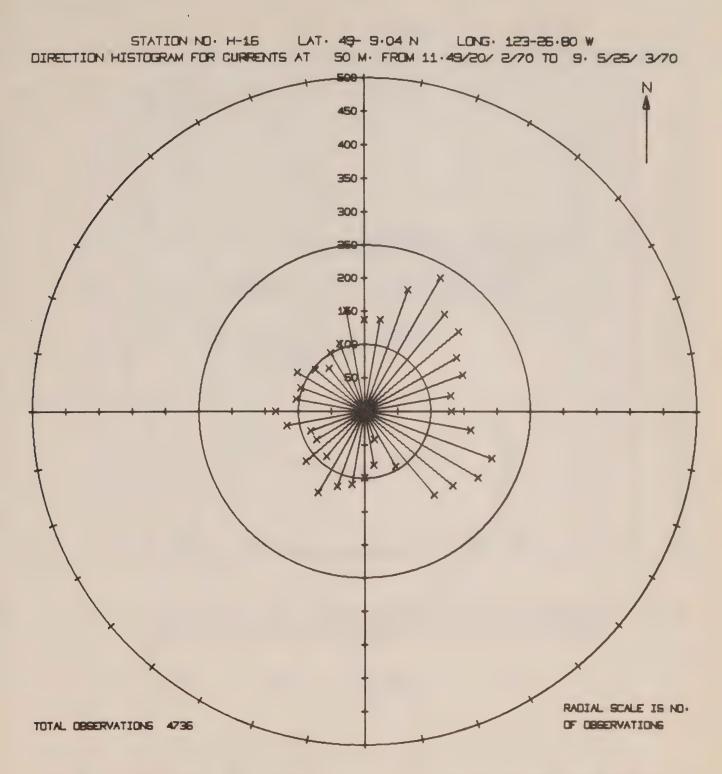


FIG. 16c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING FEBRUARY 20 THROUGH MARCH 25, 1970.

LAT. 49- 9.34 N LONG. 123-26.80 W

STATION NO. H-16

GSTOSRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS STRYATION PERIOD, FROM 11.49/20/ 2/70 TO 9.5/25/ 3/70 1. MP. 200 800 900 300 400 500 600 700 FREDUENCY O 100 1000 40. PC1. I 7.00 7.15 7.10 7.15 7.35 /.5U /.55 /.50 27 127 2001 ********** 341 1.75 7.30 7.40 7.90 1.13 ε #3 75 ° . Lu .20 7.30 .35 H. +0 ..45 8.50 5000 30/0 0.80 7. • 45 4. 10 3.00 3.10 9.15

FIG. 16D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING FEBRUARY 20 THROUGH MARCH 25, 1970.

WIMBER OF TEMP. GREATER THAN 9.20 =) NUMBER OF OBSERVATIONS = 4736 MEAN TEMP = 7.86 DEG. C.

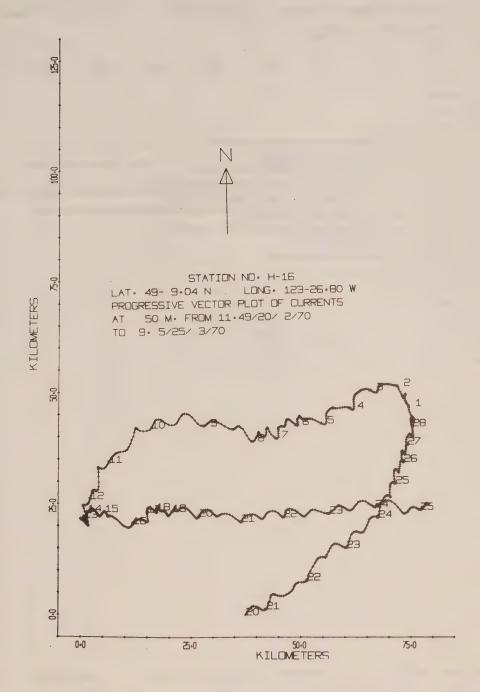


Fig. 16e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 33-day period during February 20 through March 25, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DBSERVATION PERIOD, FROM 12. 5/25/ 3/70 TO 17.25/26/ 4/70

MEAN SPEED	FREQU	eNCY PCT.		103	150 I	200	250 I	300 I	350 1	400 I	45 0	000 1
O.	0		2									
10	60	1	0********	•								
20	27	1	0****									
30 40	5 3	1	()									
50	114	2)*********									
60	246	5										
70	227	5	1)********		*****	• • • • • • • • • •	* *					
40	403	9		**********				******	******	******		
90	264	6	0 * * * * * * * * * * * * * *									
100	311 460	7 10										
120	204	6										
1 ±0	397	9						******	******	*****		
140	227	5		• • • • • • • • • • • • •								
150	296	5	0				• • • • • • • • • •	****				
160 170	176 158	4 خ)******			•						
180	197	4										
170	95	2	· · · · · · · · · · · · · · · · · · ·									
200	151	3	0		*****							
210	94	2	0 *********									
220 230	103 51	2	() • × • • • • • • • • • • • • • • • • •	********								
240	36	1)*****									
250	42	ī	0 * * * * * * * *									
250	18)	() * * * *									
270	21		()***									
280	20	0	0****									
290 300	15 5	0	() * * * *									
310	6	0										
320	4	Э	0*									
3 3 0	1	Q	O									
340	Ü	0	()									
350 360	1	0	0									
370	0		0									
380	0	j	0									
390	0	O	0									
400	U	j	n									
410 420	7	_	0									
430	0	0	0									
440	Ö	ij	Ó									
450	0	Ũ	· P									
460	0	Ü	0									
473 480	0	0	0									
490	2	Ö	0									
500	ົງ	9	0									
510	0	0	0									
520	0	0	0									
530 540	0	0	0									
550	0	0	0									
560	ŋ	ō	0									
570	ō	0	0									
580	0	0	0									
590	0	,)	0									
600	1	0	0									
NUMBER	OF SPEE	DS GI	REATER THAN	600 = 0	NUM	BER OF OBS	ERVATIONS *	4641	MEA	N SPEED =	124 MM/SEC	

A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT FIG. 17A. 10-MINUTE INTERVALS OVER 32-DAY PERIOD DURING MARCH 25 THROUGH APRIL 26, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES DESCRIVATION PERIOD, FROM 12. 5/25/ 3/70 TO 17.25/26/ 4/70

```
FREQUENCY O
MEAN
                             50
                                    100
                                                   150
                                                              200
                                                                         250
                                                                                    360
                                                                                               350
                                                                                                          400
                                                                                                                     450
             PCT.
DIR.
                   ()*****
                    0 * * * * * * * * * *
  15
                   O********
  ,20
25
         86
                    85
        120
         117
  45
50
55
         78
  40
          7.7
  85
  20
         73
  35
 115
         99
 120
        133
 125
        146
        159
203
 135
        223
 140
        227
 150
 155
 160
 165
                   O++++++++
         35
                   O********
 175
                    .
 180
 190
 195
200
                   )*********
205
                   0 *****
                   0****
215
                   0 ***
                    )***
 230
                   3****
235
                   0 * * * * *
240
                   0 * # # #
245
                   0****
          32
                   0 * * * * *
255
                   ) ******
260
                   0.....
 265
 270
                   0***
275
                    (1×++)
280
                   0 * * * *
285
                    7****
 230
                   ) * * * *
295
                   0***
 300
 305
 310
                   0****
 315
          6
               0 0+
320
                   0 ****
 325
         16
                   0 * * *
 330
                   0 * * *
 335
                    )****
 340
345
                    0 * * * * *
350
 355
                   0****
```

FIG. 17B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 32-DAY PERIOD DURING MARCH 25 THROUGH APRIL 26, 1970.

NUMBER OF OBSERVATIONS = 4641

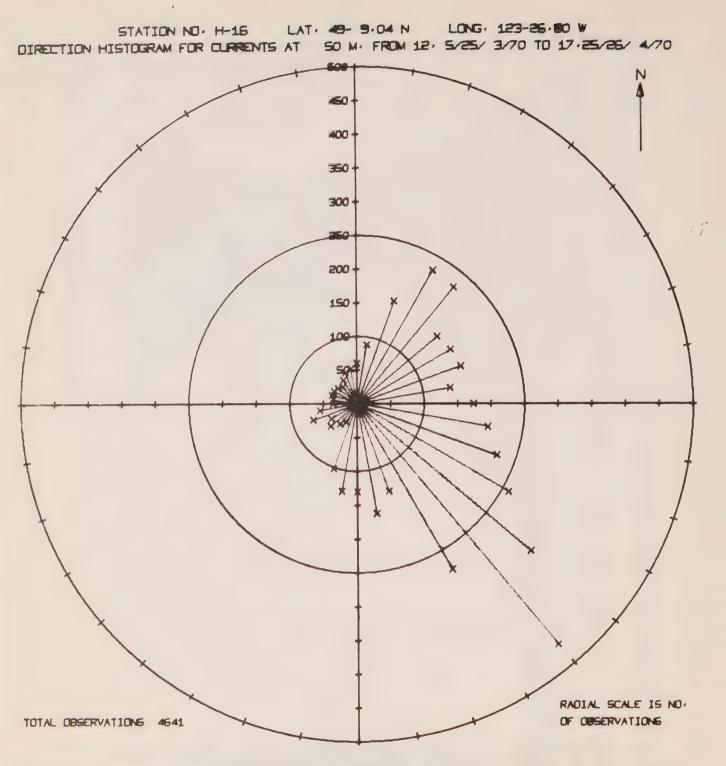
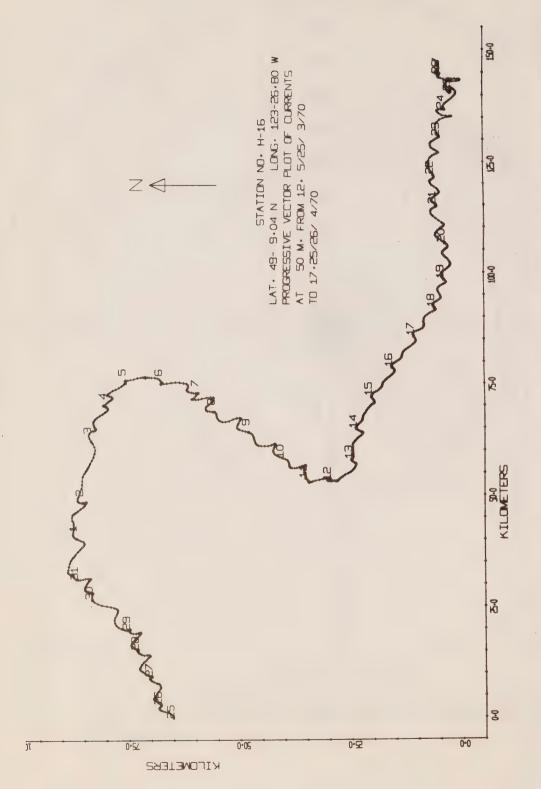


FIG. 17c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 32-DAY PERIOD DURING MARCH 25 THROUGH APRIL 26, 1970.

ATATION: NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 M

(LUFOWRAM OF TEMPERATURE (DEG. CLNT.) AT A DEPTH OF 50 METERS
DESERVATION PERIOD, FROM 12. 5/25/ 3/70 TO 17.25/26/ 4/70

1 0 0 0 0 0 0 0 0						
0 0 0						
0 0 0						
1 0 0 0 0 0 2 0 0 481 10 0	• • • • • • •			,,		
2174 47 0* 1295 28 0* 420 .9 0* 101 2 0*			••••••			
10 0 0 14 0 2 0 0	•					
3 3 0						
3 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
0 0 0 2 J 0 12 0 0						
1 0 0 2 0 0 4 0 0 0 0 0						
2 0 0 2 0 0 1 0 0 0 J 0 0 C 1						
1 0 0 0 0 0 0 0 0 0 0 0						
0 0 0 8 0 0 1 0 0 1 0 0						
0 0 0 0 J 0 1 0 0 0 0 J						
1 0 0 0 0 0 0 0 0 1 0 0						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
0 0 0 0 0 0 0 0 0						
0 0 0 0 0 0 0 0 0 0 0 0						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
0 0 0						
0 9 0 0 0 0 0 0 0						
0 0 0 0 0 0 0 0 0						



March 25 through April 26, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion of the entire neighboring area of the location of the instrument was the same A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 32-day period during as at this location.

Fig. 17e.

STATION NO. 1-16 E41. 49- 9.5- % LONG. 123-26.80 W

HISTURAN OF SPECO (MM/SCC) FOR CURRINTS AT A DEPTH OF 50 METRES (S RVATION PERIOD, FROM 10.43/23/ 4/7° 1) 12.19/10/ 6/70

5°E.0		POT.	I		300 I.	400 I	500 I	600	008 00	900 I	100
1)	.1	J	S)								
2)	, , .	- , .)								
4.,	1 '	Ú									
20	2 + .)***								
5 7.)	152 175	- L - 3									
ρĺ	365	ပ်	j*********								
4.)	. 25?	4 -	?*******								
. 10 115	331	,)********								
157	414	1)********		********						
140	501	3	O**********	*******	********	*******		*			
140 150	639	7 15)***********					****			
150	372	ر ۲۰	A******								
17)	299	، ز	~*********		*****						
130	360	٥	O**********								
2.30	1 o d 2 6 6				***						
210	113		3********								
220	153	2)************	***							
230	94 85	2 1)********								
.51) -	. 2									
59	54	1	.)****								
275 . 30	5.7 46	i	**************************************								
, 40	34	1	2448								
40 y	. 25)	()***								
31.) 32.)	22	1.4	() # # () # # #								
330	.2	101	1. #								
34)	1.3	,	() # H								
352 360	3		7								
,7U	j j		,								
330)	را -)								
393 470	ر. ن))								
410	j)	ý								
420	Ü)	J								
430 440))	. j)								
450	2	. U .)								
460.	Ü	0	0								
475 430	() ()	٦	7								
430	?	U)								
500	()	· 1	J								
510 520	3 3	O (1))								
530	0	· 5	ó								
240	ÿ	į,	0								
550 560	. 5	Ú.	0								
570	j	0 5	3								
530	Ç	٥.	ว								
590	Ü	U n	0								
500 610	0	0 0	<u>)</u>								
520	Ū	(,	2								
630	1	J.	0								
NUMBER	OF SPE	IDS GF	REATER THAN	630 = :	NUM	BER OF OBS	ERVATIONS =	6201	MEAN SPEED =	149 MM/	SEC

FIG. 18A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 43-DAY PERIOD DURING APRIL 28 THROUGH JUNE 10, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 10.48/28/ 4/70 TO 12.19/10/ 6/70

MEAN	ED 0	UENCY	o 50	100	150	200	250	300	350	400	4.50	500
DIR.	NO.			105	1	1	1	1	1	400	450 I	500
0.17.	105	2			•	,	•	•		I	1	I
5	113	2		*********								
10	112	2	0 *********									
15	138	2										
20	184	3	0******		*******	***						•
25	108	3	0 *** * * * * * * *		*******	****						
30	132	2	0 * * * * * * * * * *	*********	***							
35	141	2) * * * * * * * * * *	**********	****							
40	100	2)********									
45	118	2		*********	*							
50	110	2	0******									
15	115	2.	-	***********								
60	89	1)******									
65	82	1	0									
7 C	106	2) * * * * * * * * * * * * * * * * * * *									
75 30	112	2)*******									
35	94	2	0*******									
20	104	2	0 ********									
95	114	2		*********								
100	120	2										
105	123	2)*******		**							
110	131	2	0 *** * * * * * * * * *	**********	***							
115	113	2	0********	**********								
120	133	2	O********		***							
125	137	2	0 * * * * * * * * * * * *	*********	***							
130	161	3	O*******	**********	******							
135	197	3		**********								
140	219	4										
145	267	4										
150	287	į.		**********				• • •				
165	229	4		**********			***					
160	163	3				•						
165	159	3										
170 175	153 125	2 2										
180	99	2	0		**							
185	65	1	0									
190	52	1	0******									
195	53	1	0*******									
210	44	1	0 * * * * * * * *									
205	49	1	0********									
210	30	Q.	0 * * * * * *									
215	33	1	3*****									
220	35	1	0 * * * * * *									
225	3.3	1	J * * * * * * *									
230	23	0)****									
235	21	0	0 * * * *									
240	14	0	0 * * *									
245	17	0	0***									
250 255	16	O j	0 * * *									
260	.20	9	0**									
265	16	0	0***									
270	11	2	0**									
275	19	ő	0****									
280	19	0	D####									
285	21	0	0 * * * *									
290	15	0	0***									
295	21	0	0 * * * *									
300	14	0	0 * * *									
305	13	0	() * * *									
310	15	0	0***									
315	11	0	0**									
320	16	0	0***									
325	22	0	0 * * * *									
330	27	0	0									
335	41	1	0 ******									
340	55	1	0 * * * * * * * * * * *									
345 350	66	1	0 ********	• • •								
355	51 63	1	0 *********									
200	0,5	1	U									

NUMBER OF OBSERVATIONS = 6201

A HISTOGRAM OF DIRECTION ("TRUE), WITH CLASS INTERVAL OF 5", FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 43-DAY PERIOD DURING APRIL 28 THROUGH JUNE 10, 1970.

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W
DIRECTION HISTOGRAM FOR CURRENTS AT 50 M. FROM 10.48/28/ 4/70 TO 12.19/10/ 6/70

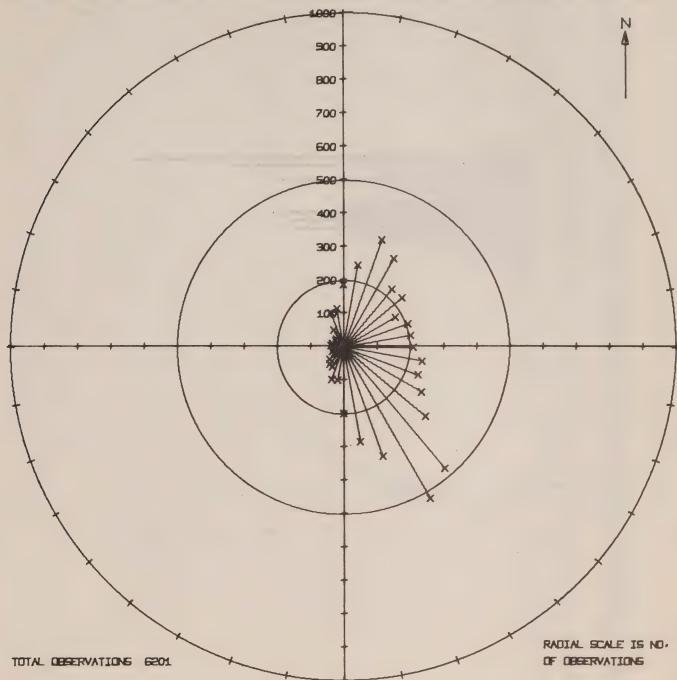


FIG. 18c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 43-DAY PERIOD DURING APRIL 28 THROUGH JUNE 10, 1970, April 200 Apr

MISTUGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS IMSERVATION PERIOD, FROM 10.48/28/ 4/70 TO 12.19/10/ 6/70

			0 100 200 300 400 500 600 700 800 900 1000
MEAN TEMP.	NO.		
7.05	0	0	0 0
7.10	Э	0	n
7.15 7.20	0	0	? 2
7.25	0	0	
7.35	0	7	0
1.40	0	0	0
1.50	0	O	n
7.55	0	Ű	0
7.65	0	0	
7.75	0	Ü	0
7.80	0	0	
1.90	148	0 2	0
1.70	527	13	()
ა.ენ ა.16	633	10)*************************************
4.15	525	Ĥ)
3.20 8.25	283 198	5 3	000000000000000000000000000000000000000
8.30	372 544	6	() >> >> >> >> >> >> >> >> >> >> >> >> >>
8.40	504	9	0
8.45	490 406	8	():
8.55	295	5	0
8.60 8.65	189 160	3	0
8.70	44 25	1	() e a d e e e e e e e e e e e e e e e e e
8.80	2.2	J	0.00
8.85	38 42	1	() + + + + + + + + + + + + + + + + + + +
8.35 9.70	9	0	C* 0
9.05	6	0	0.
9.1U ≥.15	5 1	0	0* 0
9.20	5	0	() * () * () * () * () * () * () * () *
9.75	16 41	0	(rea Qease
9.35	15 12	9	Jan
4.45	4	Ū	0
9.55	3 2	O	
4.60	1	0	
9.65	18	0	0 • •
9.75 9.80	0	0	0 .
9.85	2	0	0
9.90	0	0	
10.00	1	0	
10.10	0	0	0
10.15	0	0	
10.25	0	0	
10.35	0	0	
10.40	0	0	
10.50	1	0	
10.55	0	0	0 0
10.65	1	0	
10.75	0	Ü	
10.90	1	0	U 0
10.90	0	0).	
11.00	0	0	
11.05	0	. 0	
11.15	0	0	0
11.25	0	0	
11.30	0	0	
11.40	0	0	0
11.45	0	0	0
11.55	0	0	
11.65	0	0	
11.7J	0	U	
11.90	0	()	,
11.85	0	0	o framework to the control of the co
11.75	1	0	n
			REATER THAN 11.95 = 0 NUMBER OF OBSERVATIONS = 6201 MEAN TEMP = 8.31 DEG. C.

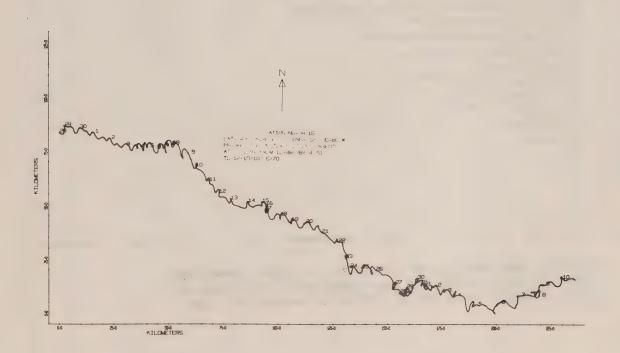


Fig. 18e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 43-day period during April 28 through June 10, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 60 METRES JBSERVATION PERIOD, FROM 9. 1/14/ 6/70 TO 7.25/28/ 7/70

MLAN SPEED		PCT.		100	200	300	400	500.	600	700	800	900	1000
37110	1		0		•	*	•	•	•	•		Α	
10	ò	0	Č										,
20	0	0	0										
3.0	1	Ú	0										
40	8	3	0.4										
5.0	29	0	0 * * *										
60	94	1		***									
70	97	2	0 * * * * * *	****									
80	232	4			********								
90	230	4			********								
100	245	4				•							
110	431	7			********		• • • • • • • • • •						
120	512 554	5			*********								
130 140	325	9 5	()*****					• • • • • • • • • • •	• •				
150	323 48 7	8		******									
160	297	5			*********								
170	276	4			********								
180	380	6		*****									
190	232	4			********								
200	3 3 4	5	7 * * * * * *		********								
210	204	3	0 * * * * * *		*****								
220	305	5	9*****	*****		*****							
230	199	3	0*****		*****								
240	2 48	3	J*****		******								
250	250	4	****	*****	* * * * * * * * * * *	*							
260	111	2	.)*****	****									
270	129	2		*****									
280	95	2	() * * * * * *										
290	97	2	0****	****									
300	42	1	0****										
310	35	1	0 * * * *										
320	46	1	0****										
330 340	14 15	0	0*										
350	5	0	0*										
3 50	6	0	0*										
370	2	Ü	0										
NUMBER (HAN 3	70 = 0	NUMI	BER OF OBS	ERVATIONS :	6329	MEA	N SPEED =	168 MM/	SEC

FIG. 19A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 44-DAY PERIOD DURING JUNE 14 THROUGH JULY 28, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES JUSTICATION PERIOD, FROM 9. 1/14/ 6/70 FO 7.25/28/ 7/70

MEAN DIR.	FREQUENC NO. PCT		200 · · · 250	300 350 I I	400 I	450 I	500 I
Ü	43, 1						
5	50. 1						
10 15	61 1						
20	58 1						
25	37 1						
30	44 1) ******	•				
3.5	54 1						
40	44 1						
45	35 1						
50 55	44 1						
50	50 1						
65	54 1						
70	62 1	1********					
75	54 1						
50	/ 61 1						
25	52 1						
70 95	35 1						
100	49 1						
105	55 1						
110	58 1						
115	62 1	○*******					
120	56 1						
125	65 1)********					
130	94 1						
<u>.</u> 40	135 2						
145	114 3						
150	157 .2) ***********					
155	156 7						
160	116 2						
165	111 2						
170 175	113 2 177 3						
150	190 3						
135	233 4						
190	179 3)****************	**				
195	1.77 3		•				
200	143 2						
205 210	160 3						
215	171	· · · · · · · · · · · · · · · · · · ·					
220	141 2						
225	133 2						
230	1'47 2						
235	119 2						
240	116 2 85 1						
250	85 1 113 × 2						
255	110 2						
260	106 2						
265	109 2						
270	111 2						
275	99 2						
280 285	87 1 80 1						
290	75 1						
295	74 1	O******					
300	59 1	() **********					
305	. 67 1	Q*********					
510	62 1	0********					
315	58 1						
320	53 1)*********)******					
325 330	44 1 33 1						
335	36 1						
340	46 1						
345	33 1						
350 355	34 1 45 1						

NUMBER OF OBSERVATIONS = 16329

FIG. 19B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 44-DAY PERIOD DURING JUNE 14 THROUGH JULY 28, 1970.

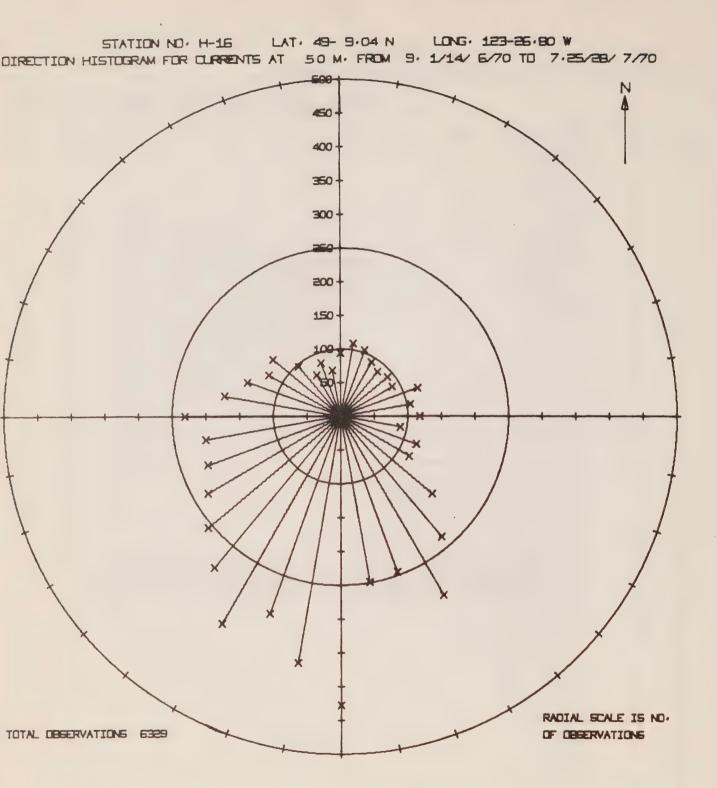


FIG. 19c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 44-DAY PERIOD DURING JUNE 14 THROUGH JULY 28, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS RECEIVATION PERIOD, FROM 9. 1/14/ 6//C TO 7.25/28/ 7/70

MJAN	FREQUE			25%	. 300	400	500 .	600	700	800	900	1000
TUMP.	NO. P			Ι.	I	I	1	. I	I	Ι,	ī	1
3.00 0.25	1.0		Ú.									
5.10	.0 J))									
p.15	í		1)									
8.20	ņ		ń									
۲.۶٥	S	-	2									
5.30	1 ')									
3.35	46	-	O####									
6.40	104	3	*)***********	* * *								
0.45	122	-	()*******									
0.50 1.55	132	14.1)**********									
0.60	164	3)*********									
8.55	219	3	1	*******								
6.70	17.6	3) * * * * * * * * * * * * * * * * * * *	***								
3.75	189	3	0	****								
0.90	. 90	1	0*******									
8.35	151	3	***********	****								
3.90	201	,	()**********	****								
8.95	221	-	0*********	*******								
7.70	296	-			******							
9.10	28? 329		0	********	*****							
9.10	5d?	9	.) * * * * * * * * * * * * * * *									
3.20	542	9		******	********							
9.25	543	ģ	0 *********	*******	********		*********					
2.30	547	9	O*********	*****	*******	*******	*********					
9.35	448	7	O********	******	********	********						
7.40	291	ŝ	O**********	*******	*****							
9.45	166	3)*******	***								
9.03	116	2	0*******									
9.55	68	1)******									
7.57 7.55	25 20	-	0***									
7.55	20 h	.0	7*									
3.75	7		0*									
7.613	,	,										
NUMBER (UF TEMP.	38E	ATER THAN 3.75	= ,	NUMB	ER OF OBSE	RVATIONS =	6329	MEAN	TEMP = 9	.06 DEG. C.	

FIG. 19d. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 44-DAY PERIOD DURING JUNE 14 THROUGH JULY 28, 1970.

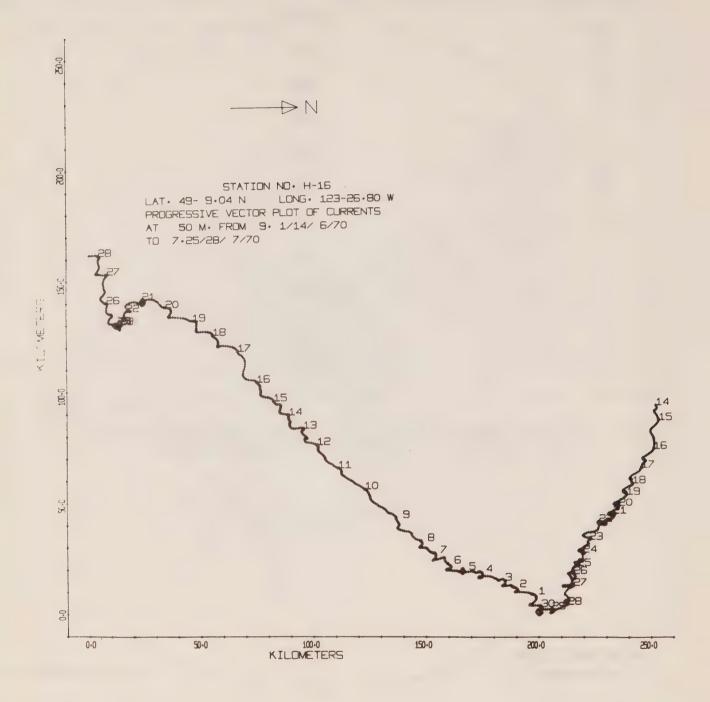


Fig. 19e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 44-day period during June 14 through July 28, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SCC) FOR CURRENTS AT A DEPTH OF 50 METRES DESTRUATION PERIOD, FROM 9.35/28/ 7/70 TO 17. 6/24/ 9/70

1.4N SPEED	EKTOU NU.	INCY POT.		100		203 I	30		400 I	500 I	600	700	900	000	1000
0)	J	٦									•	•	·	
10	. 3	0	5												
20	2	()													
30	1		2												
40 5.0	2 1!	r'	') *												
50	79	1	0*****												
70	100	î													
46	277			****											
90	162	.?		****											
100	215	3	O*****	** > 0 2 1		N 1 1 2 4 4									
110	364	4	0*****		***		*****	******							
120	325	4	0*****		* * * *	*	*****								
130	573 437	. !)*****			* * < * * *				• • • • • • • • • • • • • • • • • • •	***				
140	737	5 9	3*****						*******						
150	53.1	6)*****				*****		******						
175	448	5		****		****	*****								
180	601	7	7*****				*****				*****				
130	404	5	()*****	****		****	*****								
200	624	7) * * * * * *	****	* * * *	* * * * * *	*****		* * * * * * *		******				
210	374	4	0*****	****		*****	*****		**						
220	453	5	()*****	****	* * * * *	*****	*****	******	*****	**					
230	261	3	0*****	*****		*****	****								
240 250	227 300	3 4	0*****	****			. * * * * * * * .	M. M.							
250	178	2	0*****												
270	234	3)*****				+ 46								
280	114	1	7												
290	131	2	() * * * * * *	****											
300	66	1		*											
310	48	1	3****												
320	58	1	C*****												
330	40	J	<u></u>												
340 350	37 14	0													
350	24	0	0**												
70د	10	7													
380	11		0#												
390	2	() ·													
400	1	0	.)												
4UMBER	OF SPEC	DS 3	REATER T	нди	435	= 3		NUMBER	OF OBS	ERVATIONS =	8400	MEA	N SPEED =	179 MM/S	EC

A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT FIG. 20A. 10-MINUTE INTERVALS OVER 58-DAY PERIOD DURING JULY 28 THROUGH SEPTEMBER 24, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTUGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES IS SERVATION PERIOD, FROM 9.35/28/ 7/70 TO 17. 6/24/ 9/70

MT, AN	EREOI	UE NC Y	0	50	100	150	200	250	300	350	400	450	500
DIP.		PCT.		1		1	1	1	I	1	ī	1	1
)	102	1	0****	* * * * * * *	*****								
5	111	1			********								
15	125 126	2											
20	149	2											
25	155	2			*******								
3.0	162	2			******								
3.5	173	2					* * *						
40	201	6											
45 £0	163	2				· • • • • • • • • • • • • • • • • • • •							
35	136	2											
٠. ن	178												
۲ در	127	3) * * * * * *										
70	154	2.			*********								
75 30	156	2			· * * * * * * * * * * * * * * * * * * *								
15	1+5	1											
10	154	2			*******								
75	155	_											
100	147	2			*******								
110	151	2			******								
110	145	2											
120	144	2											
12.	L / 19	2											
13;	264		(1844894)		*******	********		**					
135	204	2				********							
140	214	3				*****							
165	202	2				· * * * * * * * * * * * * * * * * * * *							
155	241	5					********	****					
160	210	3	O*****	* * * * * * *			********						
145	143	2											
170	167	2											
175	171	2				· * * * * * * * * * * * * * * * * * * *							
135	153	2			*******								
170	155	2											
195	154	2	O * * * * * * * *	* * * * * * *	*******	******							
200	132	2			******								
2.05	97 84	1	()*****										
215	19	1	0 *****										
223	75	ī	C*****										
2.15	71	1	// ******	*****	*								
230	59	1	7******										
235	54 77	1	J*****										
. 45	67	1	() * * * * * * * *										
250	47	1	0 *****										
255	56	1)*****										
260	50	1	3*****										
255 270	47 39	1	0*****										
275	99 41	J.	· () * * * * * * *										
280	46	1	0 * * * * * *										
2 0 5	44	1	0*****										
290	47	1	()*****										
2.15	45	1	0 *****										
305	40 41	ن خ	0										
310	41		0 *****										
315	52	1	O######										
220	48	_	0 *****										
٠ ٦ ٦	58	1	0 ******										
2 2 . 7	53	1	0 *****										
330	15.7												
330 335 40	52 53	1	******										
115	52 53 20												
335 40	53	1	*)******		* * * 4								

ILMPER OF USSERVATIONS = 8400

FIG. 20B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 58-DAY PERIOD DURING JULY 28 THROUGH SEPTEMBER 24, 1970.

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W 50 M. FROM 9.35/28/ 7/70 TO 17. 6/24/ 9/70 DIRECTION HISTOGRAM FOR CLIRENTS AT 450 400 350 300 -200 4

FIG. 20c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 58-DAY PERIOD DURING JULY 28 THROUGH SEPTEMBER 24, 1970.

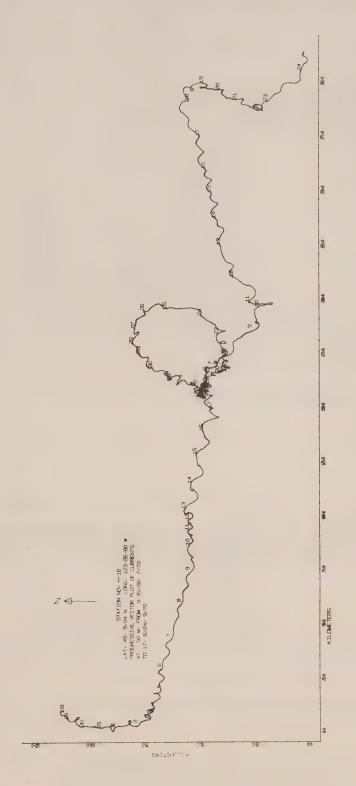
TOTAL DESERVATIONS 8400

RADIAL SCALE IS NO. OF OBSERVATIONS

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS UNSURVATION PERIOD, FROM 9.35/28/ 7/70 TO 17. 6/24/ 9/70

IMP.		ENCY PCT.		200 I	300 I	400 I	500 I	000 I	70 0 I	800 I	900 I	10
8.00	ü		2									
P.O.	0	C	0									
5.10	0	0										
8.15	0		C									
8.20	0	0	0									
d.25	C	С	0									
6.30	0	0	0									
8.35	0	J	Ö									
0.40	0	3	0									
5.45	0	C	C									
8.50	0	0	0									
8.55		Ü	9									
6.60	.))	0	C									
8.70	0	0	0									
8.75	9	0	1									
3.80	10		0*									
d.85	26	9	0***									
3.70	27	0	0**									
3.75	26	1	0****									
9.10	125	1	()********									
9.05	156	2	(*******									
1.10	183	2)*************									
1.15	174	2										
9.20	270	3		********								
9.25	4/8	J	O**********	*******								
1.30	5 75	7	O*********	********		*******	*******					
7.15	665	5	O*********	*******		* * * * * * * * * * * *	*******	*********				
9.40	599	7	() *** * * * * * * * * * * * * * * * * *			*********	*******	*****				
1.45	573	7	O*****	******	********	**********	• • • • • • • • •	***				
9.50	564	7	()*********	********	*******	*********	*******	* *				
4.35												
	529	6	0 * * * * * * * * * * * * * * * * * * *	********		• • • • • • • • • • • •	*****					
	378	5	O * * * * * * * * * * * * * * * * * * *	******		* * * * * * * * * * * * *	*****					
9.60	378 371	5	() * * * * * * * * * * * * * * * * * * *	*******		****	*****					
9.65 9.70	378 371 346	5 4 4	O * * * * * * * * * * * * * * * * * * *	******		**************************************	*****					
9.65 9.70 9.75	378 371 346 304	5 4 4 4	() * * * * * * * * * * * * * * * * * * *			****	*****					
9.65 9.70 9.75 9.80	378 371 346 304 217	5 4 4 4 3	0			****	****					
9.65 9.70 9.75 3.80 3.85	378 371 346 304 217 99	5 4 4 4 3 1					*****					
9.65 9.70 9.75 3.80 3.35 3.70	378 371 346 304 217 99	5 4 4 4 3 1 2				• • • • • • • • • • • • • • • • • • •	*****					
9.65 7.70 9.75 7.80 7.35 7.90 7.95	378 371 346 304 217 99 145 147	5 4 4 4 3 1 2 2				• • • • • • • • • • • • • • • • • • •	*****					
9.65 9.75 9.80 9.35 9.95 9.95 9.95	378 371 346 304 217 99 145 142	5 4 4 4 3 1 2 2				••••	*****					
9.65 9.75 9.75 9.80 9.35 9.95 9.95 0.05	378 371 346 304 217 99 145 147	5 4 4 4 3 1 2 2				••••	*****					
9.65 9.75 9.75 9.80 9.85 9.95 2.00 9.95 0.10	378 371 346 304 217 99 145 142 139	5 4 4 3 1 2 2 2					*****					
9.65 9.75 9.80 9.35 1.70 9.95 1.70 0.05 0.10 0.15	378 371 346 304 217 99 145 142 139 125	5 4 4 3 1 2 2 2 1				••••	•••••					
9.65 9.75 9.75 9.80 9.35 9.95 0.05 0.10 0.15 0.20	378 371 346 304 217 99 145 142 139 125 111	5 4 4 3 1 2 2 2 1 1				••••	*****					
9.65 9.70 9.75 9.80 9.35 9.95 9.95 0.05 0.10 0.15 0.25	378 371 346 304 217 99 145 142 139 125 111 125 127	5 4 4 3 1 2 2 2 1 1 2					*****					
9.65 9.70 9.75 7.80 7.80 7.85 7.95 2.00 0.15 2.20 0.25 0.30	378 371 346 304 217 99 145 147 139 125 111 125 127 92	5 4 4 4 3 1 2 2 2 1 1 1 2					•••••					
9.65 9.70 9.75 3.80 3.35 3.35 3.95 2.00 0.05 0.10 0.15 2.25 0.35 0.35 0.40	378 371 346 304 217 99 145 142 139 125 111 125 127 92 59	5 4 4 3 1 2 2 2 1 1 1 2				••••	•••••					
9.65 9.70 9.75 7.80 7.80 7.95 7.90 7.00 7.00 7.00 7.00 7.00 7.00 7.00 7.00 7.00 7.00	378 371 346 304 217 99 145 147 139 125 111 125 127 92 59 101 90	5 4 4 3 1 2 2 2 1 1 1 2 1				****	•••••					
9.65 9.70	378 371 346 304 217 99 145 142 139 125 111 125 127 92 59 101 101 90 78	5 4 4 3 1 2 2 2 1 1 1 1 1					*****					
9.65 9.70 9.75 9.75 1.85 1.90 1.05	378 371 346 304 217 99 145 142 139 125 111 125 127 92 59 101 101 90 78 81	5 4 4 3 1 2 2 2 1 1 1 1 1 1				•	•••••					
9.65 9.70	378 371 346 304 217 99 145 147 125 121 125 127 92 59 101 101 90 78 81 81	5 4 4 3 1 2 2 1 1 1 1 1 1 1				••••	•••••					
9.65 3.75 3.80 3.85 3.95 2.00 0.05 0.15 0.25 0.35 0.45 0.55 0.55 0.65	378 371 346 304 217 99 145 142 139 125 121 125 127 92 59 101 90 78 81 81 49	5 4 4 4 3 1 2 2 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1				•	*****					
9.65 3.70 9.75 9.75 1.80 1.85 1.70 1.85 1.70 1.85 1.70 1.85 1.90 1.85 1.90 1.85 1.90 1.85 1.90 1.85 1.90 1.80	378 371 346 304 217 99 145 147 125 121 125 127 92 59 101 101 90 78 81 81	5 4 4 3 1 2 2 1 1 1 1 1 1 1					•••••					

A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT FIG. 20D. 10-MINUTE INTERVALS OVER 58-DAY PERIOD DURING JULY 28 THROUGH SEPTEMBER 24, 1970.



A progressive vector diagram constructed from successive cumulative values of north-south and east-west that would occur if the motion in the entire neighboring area of the location of the instrument was the components of current velocity from records obtained at 10-minute intervals over 58-day period during July 28 through September 24, 1970. The spatial scale corresponds to the displacement of the water same as at this location.

Fig. 20e.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES OBSERVATION PERIOD, FROM 9.25/16/ 4/69 TO 14.45/22/ 4/69

MEAN SPEED	FREQ NO.	UENCY PCT.		40 I	60 I	80	100 I	120	140 I	160 I	180	200
0 .	0	0	0									
10	64	7	0		*****							;
20	26	3	() * * * * * * * * * * * * *	+								
30	38	4	0	*****								
40	99	10	0 * * * * * * * * * * * * * * * * * * *	*********	*****		•					
50	68	8	0 * * * * * * * * * * * * * * * * * * *		********							
60	111	12	0	*********	********	*********	*********	• • •				
70	69		00000000000000		******							
80	86	10	0 *** * * * * * * * * * * * * * * * * *	**********	********	********						
90	40	4		******								
100	21	2	0 * * * * * * * * * * * *									
110	40	4	0********									
120	26	3	0 * * * * * * * * * * * * * * * * * * *									
130	42	5	0									
140	20	2	0 * * * * * * * * * * * * * * * * * * *									
150 160	32 20	2	0******									
170	10	1	0****									
180	28	3	0*********									
190	16	2	0*****									
200	26	3	0*********									
210	7	1	0***									
220	6	1	0 * * *									
230	3	0	0 **									
240	0	0	0			•						
250	5	1	0***									
260	0	0	0									
270	0	0	0									
280	0	0	0									
290	0	0	0									
300	0	0	0									
310	9	0	0									
320	0	U	0									
330	0	0	0									
340	0	0	0									
350 360	1	0	0*									
370	1	0	0*									
380	0	0	0									
390	0	C	0									
400	0	0	0									
410	Ô	Ö	0									
420	0	,	1									
430	0	Ú	J									
440	0	0	0									
450	1		0*									
				+50 = 0	NUMI	BER OF OBSE	RVATIONS :	897	MEAI	N SPEED =	87 MM/SE	

FIG. 21A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED
AT 10-MINUTE INTERVALS OVER 6-DAY PERIOD DURING APRIL 16 THROUGH APRIL 22, 1969. SPEED
LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

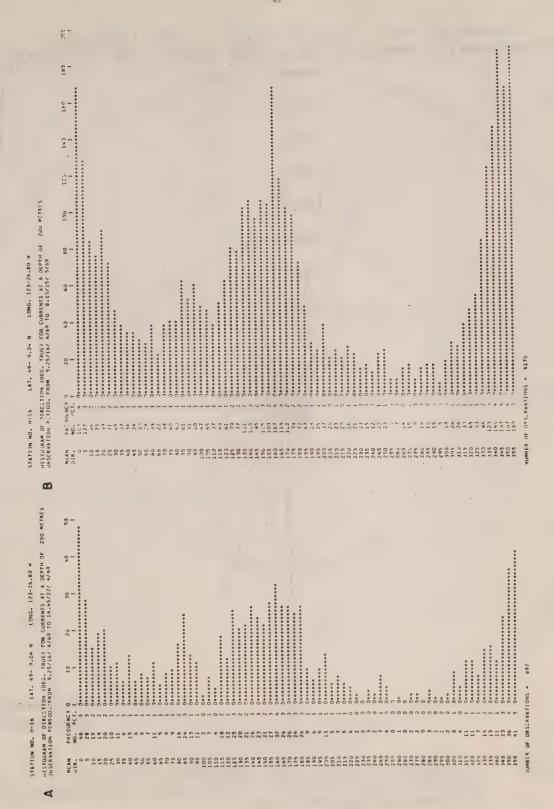


FIG. 21B. A. A HISTOGRAM OF DIRECTION ("TRUE) WITH CLASS INTERVAL OF 5", FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 6-DAY PERIOD DURING APRIL 16 THROUGH APRIL 22, 1969.

B. A HISTOGRAM OF DIRECTION ("TRUE) WITH CLASS INTERVAL OF 5", FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969.

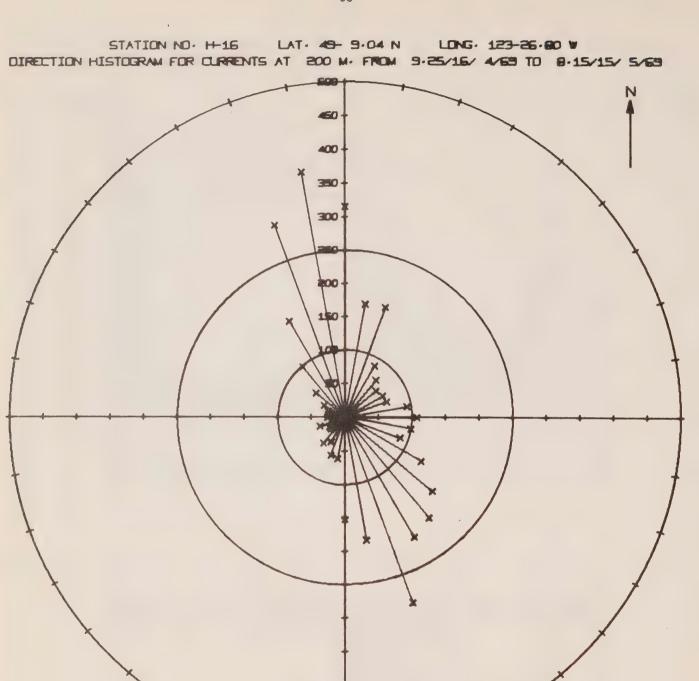


FIG. 21c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969.

RADIAL SCALE IS NO. DF DBGERVATIONS Α

```
LAT. 49- 9.04 N
STATIUN NO. H-16
HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS OBSERVATION PERIOD, FROM 9.25/16/ 4/69 TO 14.45/22/ 4/69
MEAN
            FREQUENCY O
                                    20
                                                 40
                                                                            80
                                                                                       100
                                                                                                    120
                                                                                                                 140
                                                                                                                              160
                                                                                                                                           180
                                                                                                                                                        200
TEMP.
                  PCT.
 7.00
 7.05
 7.10
7.15
7.20
7.25
7.30
  7.35
 7.40
7.45
7.50
7.55
7.60
7.65
7.70
  7.75
  7.80
  7.85
             79
  7.90
             80
  7.95
            104
  8.00
            163
124
                    18
  8.05
  8.10
            129
  8.15
  8.20
  3.25
             36
                         0***********
  8.30
             10
                        0++
  8.35
 NUMBER OF TEMP. GREATER THAN 8.35 = 0
                                                              NUMBER OF OBSERVATIONS =
                                                                                                                    MEAN TEMP = 8.02 DEG. C.
STATION NO. H-16
                           LAT. 49- 9.04 N
                                                    LONG. 123-26.80 W
HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 OBSERVATION PERIOD, FROM 9.25/16/ 4/69 TO 8.15/15/ 5/69
                                                                    200 METERS
MEAN
            FREQUENCY O
                                   100
                                                200
                                                             30ú
                                                                                       500
                                                                                                    600
                                                                                                                 700
                                                                                                                              800
                                                                                                                                           900
                                                                                                                                                       1000
                  PCT.
TEMP.
            NO.
  7.00
  7.05
 7.10
7.15
7.20
7.25
7.30
  7.35
  7.40
  7.45
  7.50
7.55
  7.60
  7.65
7.70
7.75
             19
                         0 **
             98
            147
  7.80
            258
  7.85
            412
  7.90
  7.95
  8.00
            592
  8.05
            543
  8.10
            424
            178
 8.15
            151
                         8.25
  8.30
             26
                                                                                                                    MEAN TEMP = 7.97 DEG. C.
NUMBER OF TEMP. GREATER THAN 8.35 = 0
                                                                NUMBER OF OBSERVATIONS = 4170
```

FIG. 21D. A. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 6-DAY PERIOD DURING APRIL 16 THROUGH APRIL 22, 1969.

B. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969.

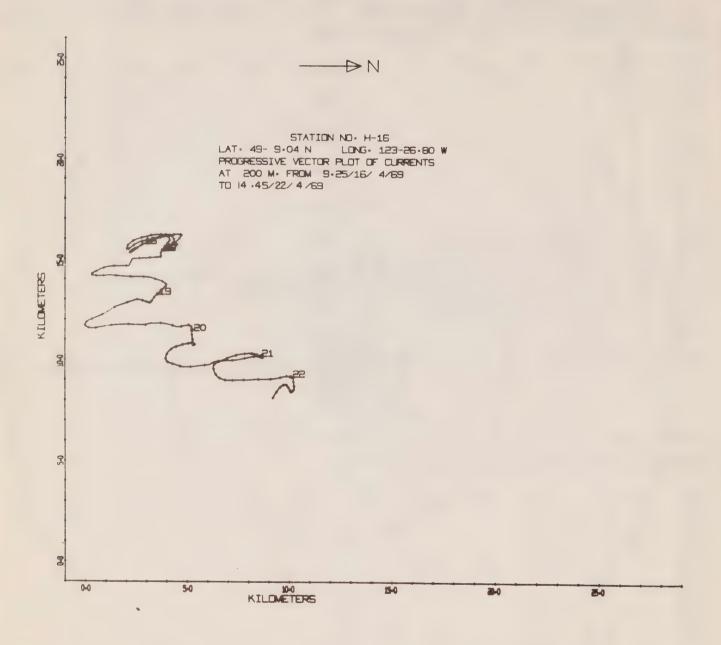


Fig. 2le. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 6-day period during April 16 through April 22, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTODRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 10.38/15/ 5/69 TO 6.28/18/ 6/69

10						
19	MIT AA.		v	2 120 150 200 250		
0 191					JU 350	400
0 191 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	DIR.	NO.	PCT.		I I	1
13	9	191	4			•
10						
15						
25			۷			
25	15	77	L	· · · · · · · · · · · · · · · · · · ·		
25	27	17	,	() *** * * * * * * * * * * * * * * *		
10 57 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1						
30						
4.)						
69 33 1	3.5	57	1			
69 33 1	4.)	3.8	1	.)		
50. 29 1 0 50 25 1 0 50 25 1 0 70 3 4 1 0 70 3 4 1 0 70 3 4 1 0 70 4 1 0 70 5 27 1 0 70 5 27 1 0 70 6 20 1 0 70 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8						
55						
bo			1			
70	55	31	1	们要要要要要		
70	60	25	1	7*****		
70				Take e e e		
75						
30						
19						
90	30	29	1	○ # # # # #		
90	25	21		()***		
75						
100 41 1 2 105 52 1 0 110 47 1 7 115 36 1 0 120 36 1 0 120 36 1 0 130 59 1 7 130 59 1 7 140 64 2 7 140 149 3 7 150 149						
105						
105	100	4 :	1]******		
110	105		1	0*****		
116 36 1 0 120 36 1 0 131 5 36 1 0 131 5 30 2 0 131 5 30 2 0 146 109 2 0 146 109 3 0 157 159 3 0 160 104 3 0 170 175 5 6 170 175 5 7 170 175 5 7 185 9/4 2 0 .						
120						
125						
130			1	· ·		
130	125	45	1	0		
135		59	1	1		
140 34 2 0 150 143 3 5 157 159 3 0 160 164 3 0 170 125 3 0 170 125 3 0 170 125 3 0 189 97 2 0 190 74 2 0 190 74 2 0 190 74 1 0 201 35 1 0 202 41 1 0 210 41 1 0 215 59 1 0 225 44 1 0 225 44 1 0 240 36 1 0 245 38 1 0 245 45 1 0 255 45 1 0 265 47 1 0 275 43						
145 103 2 0						
150			2			
166	145	103	2	() ********************		
166	150	143	3			
166	155		4	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
105						
170						
175						
140	170	125	3	○ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □		
185	175	4 +				
185				0*********		
170						
175						
200						
215 41 1 0 ********************************	1 75	54	1			
210	200	35	1	O######		
210	2.)5	41	1	O******		
215						
220						
225						
230	220	43	1	O########		
230	225	44	1	O******		
235				O *****		
240				·		
245						
250						
255	245	38	1			
255	250	44	1	0*******		
260						
265						
270						
275	265	42	1	C*****		
275	270	27	1	O * * * * *		
290 32 1	275		1	()******		
295						
290						
275						
370 45 1 0***********************************	290	32	1			
300	275	38	1	O*****		
305 23 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		45	1	0******		
31) 26 1 0***** 31) 35 1 0****** 320 +7 1 0******* 325 07 1 0********* 330 88 2 0************** 331 108 2 0**********************************						
315 35 1						
320 +7 1 C+++++++++++++++++++++++++++++++++						
325						
330 88 2 0********************************						
330 88 2 0 *******************************	325	07				
335 108 2 () + + + + + + + + + + + + + + + + + +	330	88	2	() *** * * * * * * * * * * * * * * * * *		
340 145 3 0***********************************						
345 22A 5 0***********************************						
350 235 6 0+++++++++++++++++++++++++++++++++++			-			
355 245 5)*******************************						
	355	245	5) ************************************		

NUMBER OF USSERVATIONS = 4872

FIG. 22A. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MAY 15 THROUGH JUNE 18, 1969.

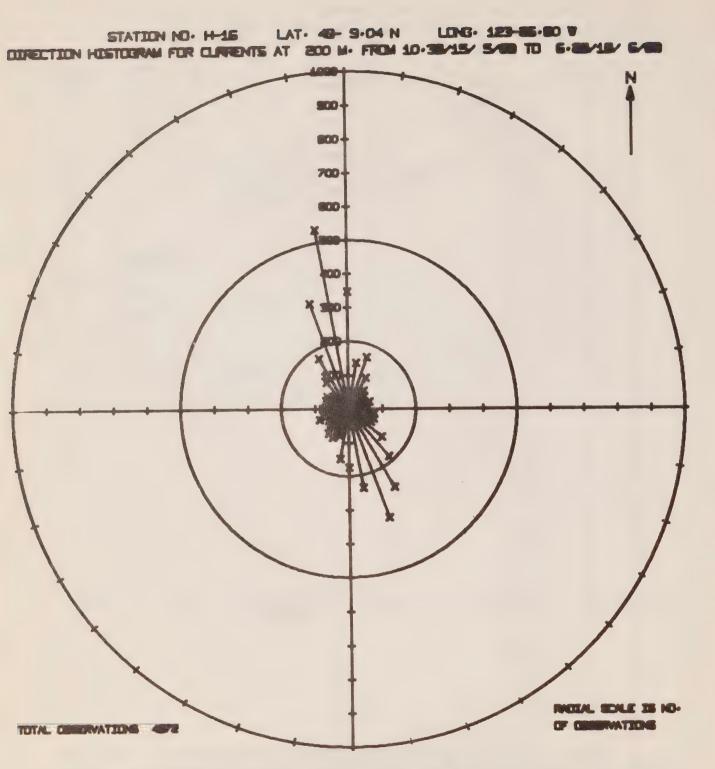


FIG. 22B. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MAY 16 THROUGH JUNE 18, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS DBSERVATION PERIOD, FROM 10.38/15/ 5/69 TO 6.28/18/ 6/69

MEAN	FREQUE			200	400	600	900	1000	1200	1400	1600	1800	200
TEMP.		CT.		Ī	1	I	1	I	I	I	I	1	
7.00	0		0										
7.05	0		0										
7.10	0	0	7										
7.15	0 0) 0											
7.20 7.25	9	0											
7.30	0		0										
7.35	0	0	9										
7.40	17	Ů.	0										
7.45	7	ő	0										
7.50	Ć	- 6	^										
7.55	0	ň	ó										
7.60	2		1										
7.65	3	,	3										
7.70	4		1										
7.75	1.2		J#										
7.80	32	1	5**										
7.85	63	î	2***										
7.90	263	5	0 * * * * *	******									
7.95	423	9	()****	******	*****								
3.00	342	. 7	0****	******	***								
5.05	192	4	O****	****									
8.10	191	4)****	****									
8.15	171 .	4 ')****	***									
8.20	320	7	0****	******	**								
⊎•25	1117	23	0****	******	********	*******	*******	********	***				
8.30	900	13	() * * * * *	******	*******	*******	*******	***					
0.35	473	10	() * * * * *	*******	******								
8.40	158	3	0****	***									
e • 45	84	2	0****										
9.50	51	1	0***										
8.55	39	1	0**										
8.60	20	0	0*										
8.65	12	0	O#										
NUMBER	UF TEMP	GRE	EATER T	HAN 8.65	= 0	NUMBE	R OF OBSE	RVATIONS =	4872	MEAN	TEMP = 8	.19 DEG. C	•

FIG. 22c. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MAY 15 THROUGH JUNE 18, 1969.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FRUM 10.49/18/ 6/69 TO 10. 2/10/ 7/69

MEAN	FREQU			50	100	150	200	250	300	350	400	450	500
SPEED	NO.	PCT.	0	I	I	I	I	I	I	I	I	I	I
10	192	6	()******										•
20	95	3	0 * * * * * * *	******	****								
30	136	4	0 * * * * * * * *	*****		***							
40	273	9	0*****	*****		*******		**********	• •				
50	154	5	Cannada		*******	******							
60 70	305	10	() * * * * * * * *		* * * * * * * * * *	********		**********					
80	201 251	6 8	0										
20	1/2	5	0										
100	152	5	0*****	*****		*****							
110	205	6	0			*******	******						
120	118	4	0 * * * * * * *	******									
130	150	5	0 ******	*****		****							
140	91	3	()******	*****	***								
150	131	4	0******	******		**							
160 170	61	2	-	****									
180	34 61	1 2	() * * * * * * * *										
1 70	36	1	7*****										
200	46	1	0 *****	* *									
210	17	î)***										
220	35	1	0*****										
230	17	1	0***										
240	16	1	0+++										
250	1.7	1	0+++										
260	10	0	0 **										
270 280	22 17	1	0***										
290	19	1	0***										
300	10	Ö	0**										
310	15	0	0+++										
320	25	1	() * * * * *										
330	14	0	0 * * *										
340	15	O	0***										
350	9	0	0 * *										
360	9	0	0 **										
370 380	2	0	0										
390	4	0	0*										
400	2	0	0										
410	7	ő	0.=										
420	7	0	0#										
430	4	0	0*										
JUMBER	OF SPEG	EDS G	REATER TH	AN 43	0 = 0	NUME	BER OF OB	SERVATIONS =	= 3159	MEAN	SPEED =	103 MM/SEG	C

FIG. 23A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

STATION NO. H-16 . LAT. 49- 9.04 N LONG. 123-26.80 W HISTUGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DISCRUATION PERIOD, FROM 10.49/18/ 6/69 TO 10. 2/10/ 7/69 1 100 MEAN FREQUENCY 0 DIP. NO. PCT. I O********* 0 * * * * * * * * * * * C***** 1 0**** 0## 0 * * * * 0*** 0**** 0*** 0****)## ()**** 0 **** 17 0 * * * 0+++ 0 * * * 0 ** * * 0 **** 0**** 0 ****** () * * * * * * 0 ******** 170 ()*************** 0 ********* 0***** 0*****)**** C*** 0 0 *** 0 * * * 0 * * * * 0 * * * * * () * # () * * * 0 * * * 0 * * * 270 0 # # 0** 0**** 0**** 0**** 0 * * * 0 *** * * * 0***** 0*****

FIG. 23B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969.

NUMBER OF OBSERVATIONS = 3159

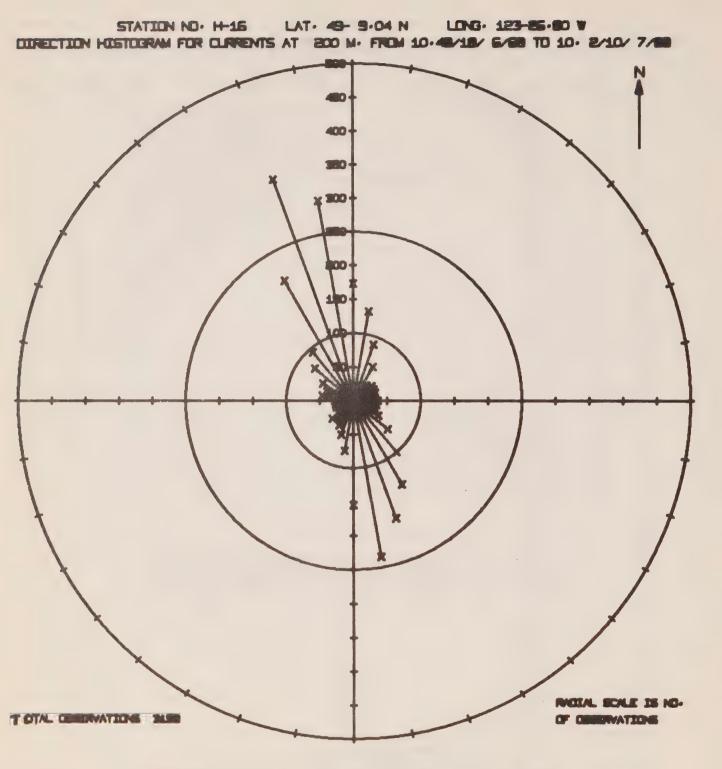


FIG. 23c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS OBSERVATION PERIOD, FROM 10.49/18/ 6/69 TO 10. 2/10/ 7/69

м ДЛ	FREQUE	NLY	0	100	230	300	400	500	600	700	800	900	1000
TEMP.	NO. P	CT.	I	I	I	I	I	I	I	I	Ī	1	I
8.20	0	0											•
1.05	0	U	.)										
1.10	Ō	U	0										
15	0	0	٠)										
6.29	27	ì) # # #										
25	547	17		*****		******		********	*				
1.30	417	13	1.444464			*******	*******						
35	217	7	O*****	****	*****								
3.40	126	4	·******	****									
11.45	129	4	·)******	****									
1.50	208	7		*****	****								
r.55	178	6		*****	***								
0.50	151	4	?******	****									
3.00	y'	3	() * * * * * * *	46-16									
0.70	168	5		*****	***								
೮.75	212	7	O*****	*****	*****								
8.80	111	4		***									
8.85	110	3	O*****	***									
8.70	201	6	******	*****	*****								
9.95	46	3	7******	***									
9.00	5.8	2	0*****										
9.35	42	1	() * * * *										
9.10	32	1	0 * * *										
9.15	17	1	0**										
3.50	13	0	0.4										
4.25	15	J)**										
9.30	5 .		-0#										
₹.35	15	Ų	># # C										
9.40	1	J	7										
.UMBER	OF TEMP.	SRI	TATER TH	in 9.40	= 0	NUMBI	ER OF OBSE	RVATIONS =	3159	MEAN	TEMP = 8	55 DEG. C.	

FIG. 23D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969.

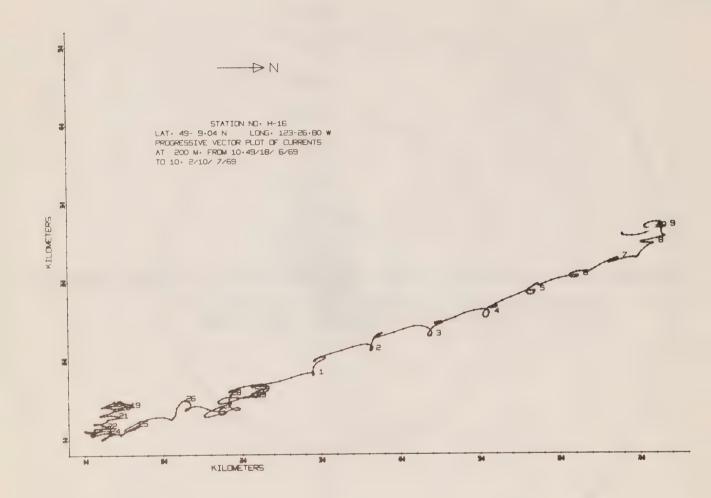


Fig. 23e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 22-day period during June 18 through July 10, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPECE (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES DESCRIVATION PERIOD, FROM 13. 2/10/ 7/69 TO 16.28/22/ 8/69

MEAN	FREDU	JENCY	0 1	00	200	300	400	530	600	700	800	900	1000
SPEED	. DN	PCT.		I	I	1	1	1	1	I	1	1	I
10	330	6	7 * * * * * * *		******								
20	123	2	7 *******										
3()	233	4	0******										
40	473	8						****					
50	373 544	6				******							
60 70	379	9	0 *** * * * * * * * * * * * * * * * * *	******	*******			********	****				
80	496	3	0										
90	329	5)******			*******							
100	293	5)******										
110	327	5				*******	•						
120	189	3	0 *******	*****	***								
130	271	4		*****	******	***							
140	176	3	()******	*****	***								
150	298	5	0*****	*****	******	*****							
160	157	3		*****	*								
170 180	143 212	2		*****									
190	125	3)******	*****	*****								
200	175	3)*****										
210	73												
220	33	1) ******										
230	43	1	0****										
240	43	1	O****										
250	69	1	0******										
260	24	0	0 **										
270	51	1	Casasa										
280	17	Ü	0 * *										
290	15	0	2**										
300 310	6	0	0*										
320	11	0	2*										
330	4	j)										
340	6	0	Ö*										
350	2	Ü	')										
360	8	J	ე#										
370	7	0	·)*										
380	1	0	0										
390	2	0	2										
430	1)	0										
410	3	J	2										
420 430	1	0	n										
440	2	0	0										
440		.,	0										
NUMBER	OF SPER	DS G	KEATER THA	N 440	= 0	NUI	MBER OF OBS	ERVATIONS	= 6224	ME 4	N SPEED =	103 MM/SE	C

FIG. 24A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 43-DAY PERIOD DURING JULY 10 THROUGH AUGUST 22, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTODRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 13. 2/10/ 7/69 TO 16.28/22/ 8/69

```
FREQUENCY 0 50 103 150 200 NO. PCT. I I I I I I I 207
                                 150 200
I I
                                                                300 353
MEAN
                                                                                  400
013.
               ·
      166
               ) * * * * * * * * * * * * *
 15
               )*****
 35
               0*******
               0 ******
 40
            0 0*****
 55
      25
32
51
36
40
47
            0 0 * * * * *
            1 0 *************
 70
            1 )*******
1 0*******
1 0*******
1 0*******
      47
44
37
44
46
39
43
 30
 95
            1 ()********
 100
            1 ()*******
 110
 115
 125
 13)
      157
 135
               Oxxxxxxxxxxxxx
 140
 145
      154
 150
      167
 155
      168
               170
      168
175
      186
 180
      162
     140
185
       96
195
200
205
210
               0*******
      56
215
              0------
223
225
      47
              0 * * * * * * * *
      38
48
230
235
            245
250
255
      43
            1 0*******
250
      40
265
            270
      43
275
290
285
            1 0******
290
              295
300
      63
310
              320
       81
325
       81
330
      101
335
              168
 340
      272
350
```

NUMBER OF UBSERVATIONS = 6224

FIG. 24B. A HISTOGRAM OF DIRECTION (*TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 43-DAY PERIOD DURING JULY 10 THROUGH AUGUST 22, 1969.

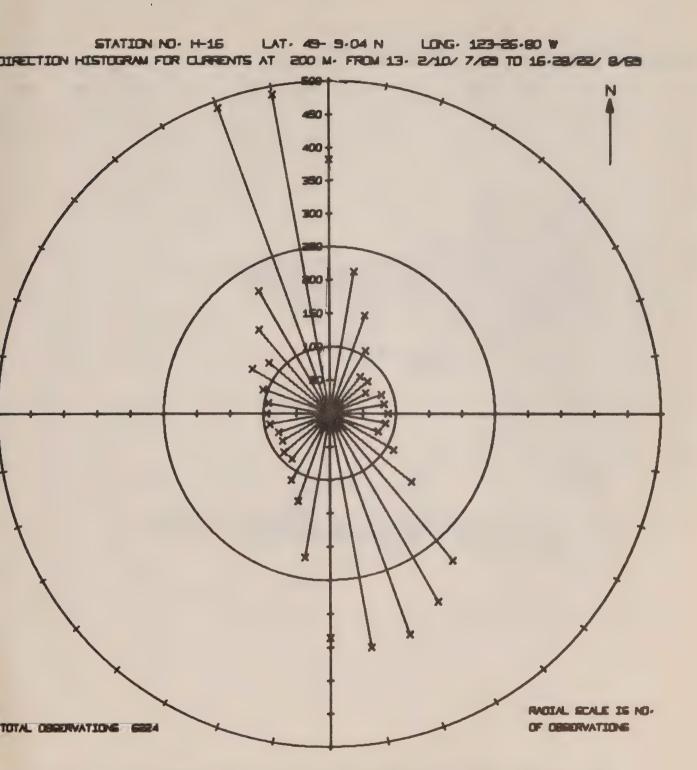


FIG. 24c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 43-DAY PERIOD DURING JULY 10 THROUGH AUGUST 22, 1969.

HISTOGRAM UF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS OBSERVATION PERIOD, FROM 13. 2/10/ 7/69 TO 16.28/22/ 8/69 FREQUENCY O 100 300 400 500 600 700 800 900 1000 MEAN TEMP. NO. PCT. I 8.00 8.05 8.15 8.25 8.30 0 * * 0 8.45 8.50 8.55 8.60 192 176

8.65 305 8.30 363 701 8.85 8.90 10 621 514 9.00 573 512

9.10 296 9.15 233 9.20 9.25 9.30 130 156 189

9.35 141 9.45 O**** 0***** 9.50 58 9.55 51 0 **** 0 ***** 9.60 55 9.65 28 0 * * * 9.70 9.80 0 * * 9.85

9.90

193

0 NUMBER OF TEMP. GREATER THAN 9.90 = 0

NUMBER OF OBSERVATIONS # 6224

MEAN TEMP = 8.96 DEG. C.

A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS FIG. 24D. OBTAINED AT 10-MINUTE INTERVALS OVER 43-DAY PERIOD DURING JULY 10 THROUGH AUGUST 22, 1969.

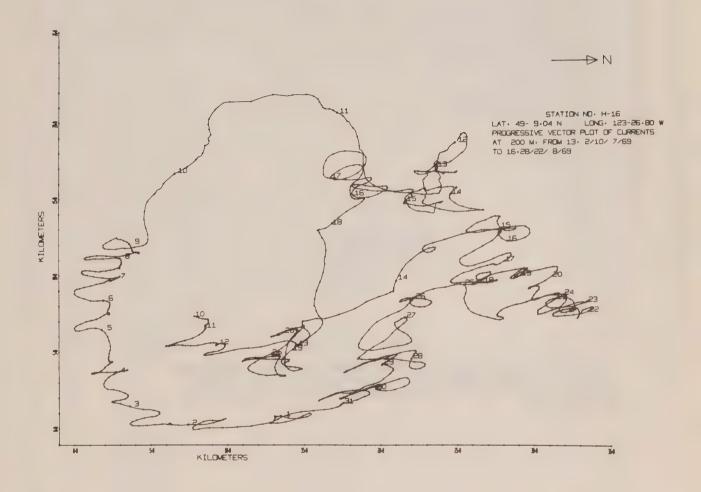


Fig. 24e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 43-day period during July 10 through August 22, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

250

300

350

400

MEAN SPEED = 100 MM/SEC

450

500

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

MEAN FREQUENCY 0 50 100 150 200

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES DISERVATION PERIOD, FROM 15.47/28/ 8/69 TO 11.57/18/ 9/69

SPEED	NO.	PCT.	I	I	i	1	I	1	I	1	1	I	
0	O	O	J										
10	307	10	0 * * * * * * *					********	******				
2.0	70	2	0.*****										
30	76	3	0*****										
40	249	8	.)******										
50	139	5		* * * * * * * * *									
50	265	9)******		******			********					
70	153	5	0 *****	* * * * * * * * *	*****	****							
80	225	7	0****										
90	138	5	0 * * * * * * *			* * *							
100	131	4	~			*							
110	163	5			*******	******							
120	78	3	() * * * * * * *	*******									
130	163	5	0*****			******							
140	125	4		* * * * * * * * *									
150	119	4			******								
160	79	3											
170	63	2	() * * * * * * *										
180	93	3			* * *								
130	47	2	0 *****										
200	85	3		******	•								
210	31	1	0 * * * * * *										
220	37	1)******										
230	3.2	1	0*****										
240	32	1	()*****										
250	39	1	() * * * * * * *	*									
260	21	1	0 * * * *										
270	18	1	0****										
280	2	0	J										
290	8	0	0 * *										
300	3	0	0 *										
310	2	0	0										
320	2	0	0										
330	1	U	C										
340	1	0	0										
350	2	Ú	0										
360	2	0	0										
370	2	O.	0										

FIG. 25A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

NUMBER OF SPEEDS GREATER THAN 370 = 0 NUMBER OF OBSERVATIONS = 3003

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DASFRVATION PERIOD, FROM 15.47/23/ 3/69 TO 11.57/18/ 9/69

MIAN DIR.	FREG	POT.		180
0111	119	4	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	I
5	66	2) **********************	
10	52	i.	7	
15	3 ნ	1)***************	
20	45	1	7************	
2.5	38	1) » » » « » « « » » » » » » » » » » »	
>0	24	1	7********	
35	37	1	<u>Овявением менения менен</u>	
40	34	1	9***********	
45	17	1	9*******	
5.3	13))******	
5.5	15	1	O******	
60	14	0	G*****	
65	22	- 1	.)********	
70	12	زا)*****)*****	
75 بان	12	,	19*****	
35	21	1)	
30	24	1	/*************************************	
75	28	1)*************************************	
133	19	1	/*************************************	
195	20	1	7*************************************	
110	17	1)*******	
115	18	ì	7*********	
120	27	1	^*************************************	
125	45	1	()******************	
130	3.7	1	^****************	
135	51	2	(****************	
140	67	2	()************************	
145	109	4	U * * * * * * * * * * * * * * * * * * *	
150	108	4	(*************************************	
155	102	3	()*************************************	
160	98	3	O**************	
155	67	2	On x 4 x 5 x 5 4 x 5 4 x 5 4 x 5 4 x 5 5 5 5	
170	89	3	`**************************************	
175	89	3	O * * * * * * * * * * * * * * * * * * *	
180	71	2		
195	47	2)**************	
190	30	1	O*******	
195	38	1	·)*************	
200	21	1	9*******	
2)5	21	1	Q********	
210	15	1	Q=======	
215	10	C	→	
220	10	U	^*****	
225	10	5)***** ()******	
230	13	. 1	()****** ')*******	
235 240	15	. 1	()***** ()*****	
240	12	3	7)*****	
250	14	3	9*****	
255	17	1	Ownerses	
260	16	1	0*******	
265	12	5	7 7	
270	16	1	0.0000000000000000000000000000000000000	
215	14	ō	0*****	
280	19	1	0*******	
285	17	1	^********	
290	26	1	9********	
295	19	1		
500	22		Onnessans	
305	32	1	<u> </u>	
310	29	1)*************	
315	33	1	?************	
320	47	2) *****************	
325	44	1	O*************	
330	55	2	1)*********************	
335	94	3	J * * * * * * * * * * * * * * * * * * *	
340	117	4	0 **************	
345	117	4	•) ************************************	
250	159	5	0	
355	131	66	^**************************************	

FIG. 25B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

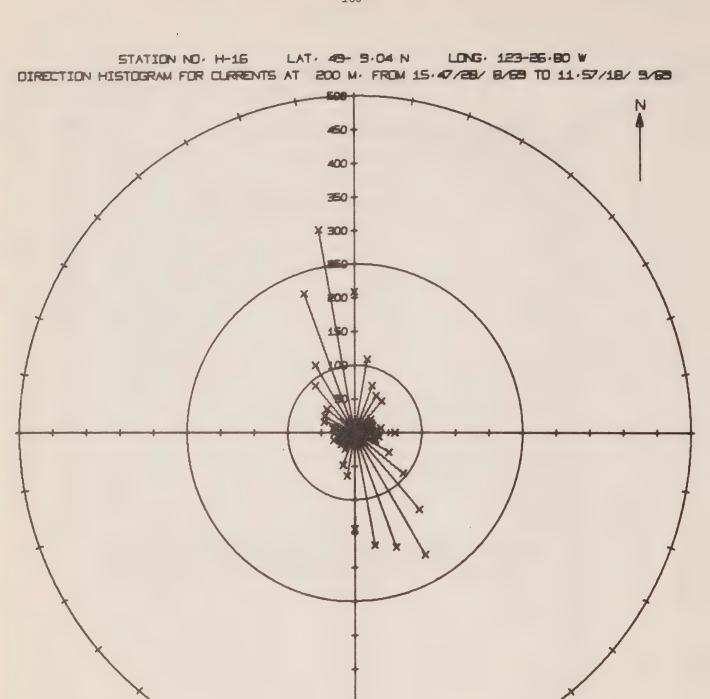


FIG. 25c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

TOTAL DESERVATIONS 3003

RADIAL SCALE IS NO.

OF DESERVATIONS

LAT. 49- 9.04 W LONG. 123-26.80 W HISTUGRAM OF TEMPERATURE (DEG. CLAT.) AT A DEPTH OF 200 METERS OF SERVATION PURIOD, FROM 15.47/20/ 8/69 TO 19.53/ 6/ 9/69 1000 700 800 900 FREQUENCY O 300 400 100 VA - N Ft MP . 2.90 3.1. 3.20 3.30 3.6, 3.7 3.83 7.90 7.90 7.10 7.20 7.30 7.40 7.7 7.7 7.7 0000 0 0 2 0*** 32)*** 0 25 429 633 79 240.13 .0.20 10.30 10.46 10.50 10.60 10.70 10.80 10.70 11.07 11.10 11.20 11.30 11.40 11.60 HUMBER OF TEMP. GREATER THAN 11.90 = 7 NUMBER OF OBSERVATIONS = 1322 MEAN TEMP = 9.15 DEG. C.

FIG. 25D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 6, 1969.

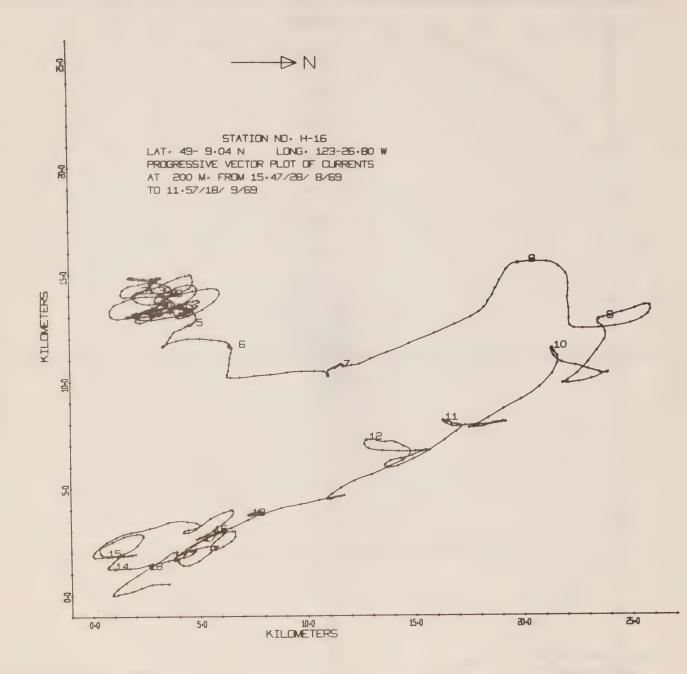


Fig. 25e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 21-day period during August 28 through September 18, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

(IST GRAM OF SPEE) (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES AS RVATIO4 058100, FROM 14.47/13/ 9/60 TO 3.10/16/1J/69

^ *J		DINCY		ica	150	200	250	300	350	400	450
110		PCT.	Ţ	Ĭ	I	Ī	I	I	I	I	I
1.	253	1		****							
2,	111	,									
31	1/2	4			*******						
411	394	1.0							*******		
5.5	7.17	7									
61	447	11	~~~		* * * * * * * * *		* * * * * * * * * *	*******			
70	217	1			******		* * * * * * * * * * *	* *			
.)	2.72	15	**********	* * * * * 1 2 2 4 4 4	* * * * * * * * * *		********	*******			
٦)	2-14)	^*********		* * * * * * * * *	*****					
1.)	217	ر	~~*********		*****						
10	279	7	*)*********		* * * * * * * * *	* * * * * * * * * *	* * * * * * * * * * *				
2)	15.	+	*********	* * * * * * * * * * *	*****						
3.5	197		• • • • • • • • • • • • • • • • • • •		*****	*****					
4.,	- 63		**********	* * * *							
C -)	105	- 5		*****							
6"	2.3	2	**********	****							
7 1	7 7	,	~~***********	4							
4	30			0 # #							
3)	7 ر		1 * * * * * * *								
C .	47	1	*******								
17	2.3	1) * * * *								
20	26	1	****								
3)	9		↑##								
4 -	15	,	F14 # #								
5)	3)) #								
6)	5) #								
73	6)	1.4								
~1	5		.1								
30	11) # #								
31	5		- (
10	2		Ç								
320	1										

FIG. 26A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES OBSERVATION PERIOD, FROM 14.47/18/ 9/69 TO 8.10/16/10/69

MEAN DIR.		JENCY PCT.		40 I	60 I	08	100 I	120 I	. 140 I	160 1	180 1	200
UIK.	193	5										I
5	127	3	· ()************									1
10	116	3	^***********	*****		******						
15	99	2	() * * * * * * * * * * * * * * * * * * *			* * * * * * * * * *						
26	36	2	() * * * * * * * * * * * * * * *	*****		*****						
25	50	2	******									
30	51	1	• • • • • • • • • • • • • • • • • • •									
35	56	1	O*********		****							
40	33	1	O****									
45	39	1	0**********									
50 5 5	24 28	1	**************************************									
60	23	1	O*****									
65	23	î	0******									
70	2.8	ī	(************									
75	24	1	0*******									
80	2.8	1	()*********									
35	32	1	()*******	•								
90	34	1	?**********	14								
95	30	1)*********									
100	38	1	O*****									
105	43	1)************									
110	46	1	() * * * * * * * * * * * * * * * * * * *									
115	45 48	1)**************									
125	48 66	2	P********		******							
130	92	7)*******									
135	112	3	**********									
140	119	3	0	*******	******	*******	*******	*****				
145	141	4	0 * * * * * * * * * * * * * * *	******	******	******	*******		******			
150	139	3	Пяккиникиникиники									
155	148	4	· · · · · · · · · · · · · · · · · · ·									
160	142	4) * * * * * * * * * * * * * * * * * * *				******	********	******			
165	66	2	O***********									
170	74	2	• * * * * * * * * * * * * * * * * * * *			***						
175	5.7	1) * * * * * * * * * * * * * * * * * * *									
180 185	66 50	2	()*********									
190	34	1	O********		~							
195	24	ī)******	7								
200	23	î	O*******									
2.25	26	1	0*********									
210	27	1	·									
215	19	Ú	0****									
220	2.3	1	()*******									
225	1.7	0)*******									
230	21	1	0******									
235 240	27 27	1	O***********									
245	24	1	()*********									
250	21	1)*******									
255	23	î	O********									
260	13	-0	() * * * * * *									
265	12	0	() * * * * * *									
270	16	0	0******									
275	16	0	()*******									
280	25	1	O*********									
285	33	1	O*********	#								
290 295	23 23	1	O***********									
300	20	1	()******									
305	23	1	O*********									
310	27	1)*********									
315	40		0**********	***								
320	25		O*********									
325	38	1	() * * * * * * * * * * * * * * * * *									
330	61		0**********									
335	75		O**********									
340	95		0**********									
1		3	~~~~~~~~~~	******								
345	113											
345 350 355	150	4	· · · · · · · · · · · · · · · · · · ·	*******		********			********	•		

FIG. 26B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

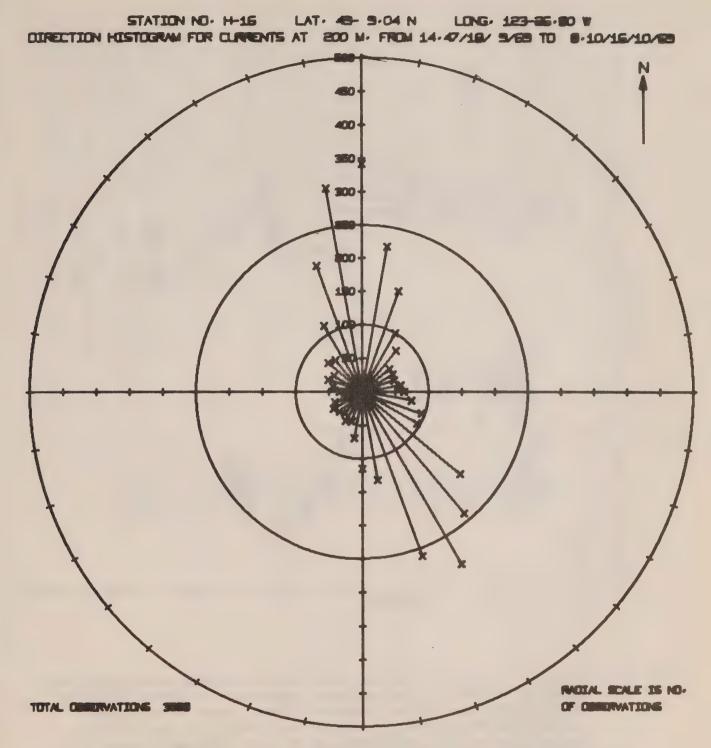


FIG. 26c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

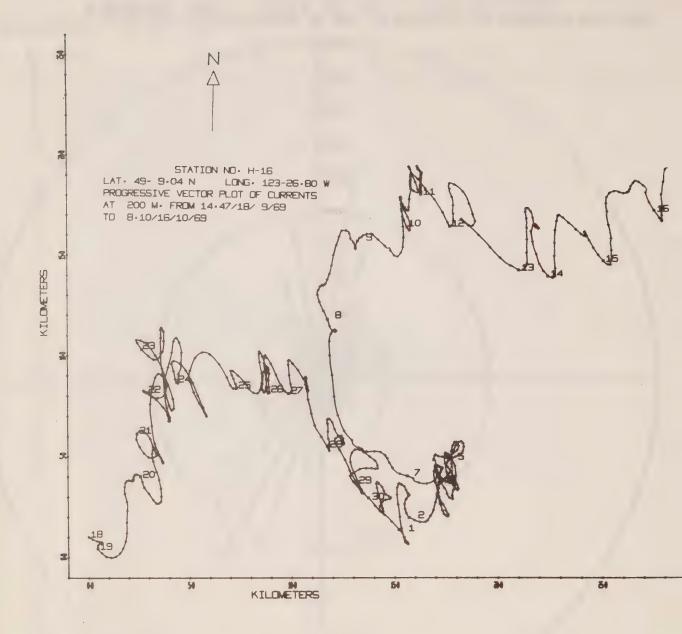


Fig. 26d. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 28-day period during September 18 through October 16, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 11. 7/16/10/69 TO 6.30/11/11/69

MEAN	FREQU			50	190	150	200	250	300	350	400	450	5
SPEED	NO.			I	I	I	1	1	I	I	- I	1	
0	2	0	C										
10	224	Ċ		******	*********		******	*					
20	97	3	7	******	*****								
30	166	4	0****	******	********	********							
40	378	10	0****	******	********	*******	*********	*******	********	********	***		
50	260	7	C*****	*****	*****	*******	******	******					
60	453	12)*****	******	*********	********	*********	********	*******	******		*****	
7.0	234	. 6	0*****	*****	*******		*********	***					
CB	293	8	0*****	*****				*********					
90	178	5	0*****	******			***						
100	161	4	7*****										
110	204	5	0*****	******			******						
120 130	128 193	3 5	0 *****				*****						
140	128	3	0*****				*****						
150	145	4	0*****			*****							
160	63	2	0*****										
170	71	2	0*****		*								
180	102	3	0*****										
190	61	2	0*****										
200	51	1	0*****										
210	27	î	0****										
220	29	î	0*****										
230	14	ō	0***										
240	12	Š	0**										
250	21	1	0****										
260	12	Č	0**										
270	7	O	9#										
230	2)	0										
290	2	0	0										
300	0	0	0										
310	0	0	n										
320	1	0	0										
1UMBER	OF SPE	EDS G	REATER T	HAN 3	20 = 0	NUM	BER OF DBSE	RVATIONS :	= 3717	MEA	N SPEED =	88 MM/SE	C

FIG. 27A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 27-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 12, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES OF SERVATION PERIOD, FROM 11. 7/16/10/69 TO 6.30/11/11/69

M. A.N.	EUC V	LNCV	0 50	100	150	200	250	200		
MLAN DIR.		JENCY.		100	150 I	200	250	300	350	400
0	NO. 164	PCT.	0*******	l		I	I	I	I	I
5	112	3	0							
10	137	4		**********						
15	71	2	0 *** *** * * * *							
20	71	2	O*********							
25	61	2	0 * * * * * * * * * *							
30	31	1	0 ****							
35	25	1	0 * * * * *							
40	21	1) * * * *							
45	19	1) * * * *							
50	15	C	3***							
55	19	1	O****							
60	23	1	0 * * * * *							
65	12	Ú	0 * *							
70	24	1)****							
75	19	1	0 * * * *							
30	21	1)***							
85	28	1	0*****							
70	25	1)**** ()****							
35 100	21 30	1	0====							
1 15	25	1	0****							
110	23	1	0****							
115	42	1	0******							
120	50	1	0*******							
125	50	î	0********							
130	63	2	0*******	**						
135	82	2	9********							
140	104	3	0							
145	121	3	0 *********	*********						
150	137	4	0 ********	**********						
155	122	3	() * * * * * * * * * *	*********	•					
160	108	3	0********	*******						
165	87	2	O*****							
170	75	2	() * * * * * * * * * * *	***						
175	47	1	O*****							
130	40	1	0*****							
185	38	1	0*****							
190	25	1	0 * * * * *							
175	23	1	9****							
200 205	20	1	0****							
210	32 33	1	0*****							
215	35	1	0******							
220	18	ō	0****							
225	26	ĭ	0****							
230	30	ī	0*****							
235	20	1	0***							
240	33	1) *****							
245	16	0	0***							
250	27	1	0 * * * *							
255	25	1	0 * * * * *							
260	18	0	0****							
265	14	Ü	0***							
270	19	1	0****							
275	15	0	0***							
280	18	0	()***							
28 5 290	13	0	0***							
290	28	1	0*****							
300	24 23	1)*****)*****							
305	25		0****							
310	24	1	3****							
315	43	1	0 * * * * * * * *							
320	35		0*****							
325	51	1	0******							
330	79		0******	****						
335	122			*********						
340	103		0 *********							
345	156	4	0********	*********						
350	210			*********		*****				
355	176	5		*********						

FIG. 27B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 27-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 12, 1969.

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-25-80 W DIRECTION HISTOGRAM FOR CLARENTS AT 200 M. FROM 11. 7/16/10/69 TO 6:30/11/11/69 450 400 350 300

FIG. 27c. A HISTOGRAM OF DIRECTION (°TRUE), IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 27-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 12, 1969.

TOTAL DESERVATIONS 3717

RADIAL SCALE IS NO.

OF DESERVATIONS

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS INSERVATION PERIOD, FROM 11. 7/16/10/69 TO 6.30/11/11/69

MEAN FEMP. 3.00	FREQUENU.	CNCY PCT.	I I	400	600 I	300 1000 I I	1200 I	1400 I	1600 I	1800 I	2000 I
3.10 3.20	1	0	0								
3.30 3.40	0	0	0 n								
3.50 3.60	0	Ü	0								
2.70 3.80	0	O	0								
3.90 4.00	0	ú	0								
4.10 4.20 4.30			0 0								
4.40 4.50	0	0	0								
4.60	0		0								
4.30	0	0	2								
5.00 5.10	0	0	2								
5.20	ù 1	0	0								
5.40 5.50 5.60	0 0 0)	20								
5.70 5.80	9		0								
5.30	0	0	0								
6.10	1 0	0 J	? ?								
5.30	0	Ü	0								
6.60	ი ა ი		0								
6.70 6.80 5.90	0		0								
7.00	0	0	n								
7.20 7.30	1 0	0	0								
7.40 7.50	0	0	2								
7.60	0	0	0								
7.80 7.90 8.00) 0 0	0	0								
8.10	1 0	0	2								
8.30	0	0	2 0								
8.50 8.60	0	U J	0								
8.70	0	0	0								
8.90 9.00 7.10	10 342 1373	0 9 37	() ************************************					••••			
9.10 9.20 9.30	1982	53	0***********		*******		*******	*****	• • • • • • • • • • • • • • • • • • • •	********	****
, , , ,											

MEAN TEMP = 9.14 DEG. C.

FIG. 27D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 27-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 12, 1969.

NUMBER OF TEMP. GREATER THAN 9.30 = 0 NUMBER OF OBSERVATIONS = 3717



Fig. 27e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 27-day period during October 16 through November 12, 1969. The spatial scale corresponds to the displacement that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRINTS AT A DEPTH OF 200 METRES OBSERVATION PERIOD, FROM 14.57/23/11/69 TO 8.29/ 9/ 1/70

MEAN	FREQU	JENCY PCT.		005	300 I	400 I	500 I	000	700	800	900	1000 I
36250	0		0	*		•		*	Α		1	1
15	730	11		*********						•		
20	245	4	5********	********								
30	1.71	4)*********	*********	***							
40	560	9	.) * * * * * * * * * * *	********		*******	* * * * * * * * * * *					
50	483	7]*********	*******		*****	****					
50	001	10) * * * * * * * * * * * *	******		******	• • • • • • • • • • •		***			
70	418	6	.)********	*****	********	*******						
80	464	7)*********			********	***					
90	262	4		*****	***							
100 110	282 350	4 5			• • • • • • • • • • • •							
120	197	3	(,*********			**						
130	411	5	0********		******							
140	139	2)********									
150	706	3) * * * * * * * * * * * * *									
160	134	2	0 *** * * * * * * * * * * * * * * * * *									
170	100	2)*****									
180	128	2	O********									
190	68	1	0*****									
200	81	1	()******									
210	44	1)****									
22)	61	1	0									
230 240	25	0)***									
250	25 40	1	0***									
260	17	5)**									
270	24		0**									
280	17		0**									
2.30	26	0	0+++									
300	13	()	O#									
310	8		C+#									
320	11		0 *									
330	В	U	0.4									
340	4		2									
350 360	1 9	Ű	0*									
370	3	Ĵ	3									
380	3		Ü									
390	5		9*									
400	2	0	0									
410	2	0	0									
420	4)	0									
430	3	0	O									
440	1	0)									
450	6		0*									
460	5		0,4									
470	0	0	0									
480 490	2	0	0									
500	1		0									
505		0										
NUMBER	OF SPEE	EDS GF	REATER THAN	500 = 0	NUM	BER OF OBS	ERVATIONS :	= 6443	MEAN	N SPEED =	87 MM/S	EC

FIG. 28A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 44-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 9, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES JUSCRVATION PERIOD, FROM 14.57/25/11/69 TO 8.29/ 9/ 1/70

ASAN DIR.	FREQUENCY NO. PCT.	
0116	145 2	. I I I I I I I I
5	1.73 2	
15	96 1	
15	90 1	() **************
20	87 .1	^*************************************
25	94 1)***********
36	59 4	
35	53 1	10000000000
40	. 40 1	Usessess
45	- 38 1	1666666
50	40 1	0******
55	33 1	0******
50	30 G)******
45	46 1	0******
70	54 1	
75	30 0	7*****
90	33 1)******
85	~5 I	()+×****
90	36 1	() ******
95	40 1)*******
100	49 1	G*******
105	34 1	() *******
110	50 1)********
115	47 1	Quantum and the contract of th
120	83 1	
125	36 1	<u>Caransuseeeeeeee</u>
130	7 2	() *****************
135	132 2	?*************************************
140	167 3) **************
145	249 4	0
150	285 4	0**************************************
155	284 4	0
150	237 4	
155	183 3	0*****************************
170	151 2	
175	136 2	
180 135	113 2	
190	97 2	Cossonaese en en consen
195	109 2)
200	91 1	
275	53. 1)*********
210	53 1	Q*******
215	32 0)*****
220	36 1	() ******
225	22 0	()****
230	31 J	0*****
235	26 0	9*****
240	33 1	0******
245) 0)******
250	,3))******
255	38 1	7******
260	27 0)****
265	40 1	3*****
270	31 0	0*****
275	36 1	0******
280	34 1	0******
285	30 0	0*****
270	46 1) + + + + + + + + + + + + + + + + + + +
295	46 1) *****
300	38 1)******
305	54 1	0*******
310	56 1)******
315	97 2	.)**************
320	134 2	
325	153 2)*********************
330	222 3)******************************
335	261 4	(*************************************
340	222 3	0***********************
115	220 3)
345	1.71	
345 350 355	171 3 143 2	()************************************

FIG. 28B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 44-DAY PERIOD DURING NOVEMBER 25, 1969

THROUGH JANUARY 9, 1970.

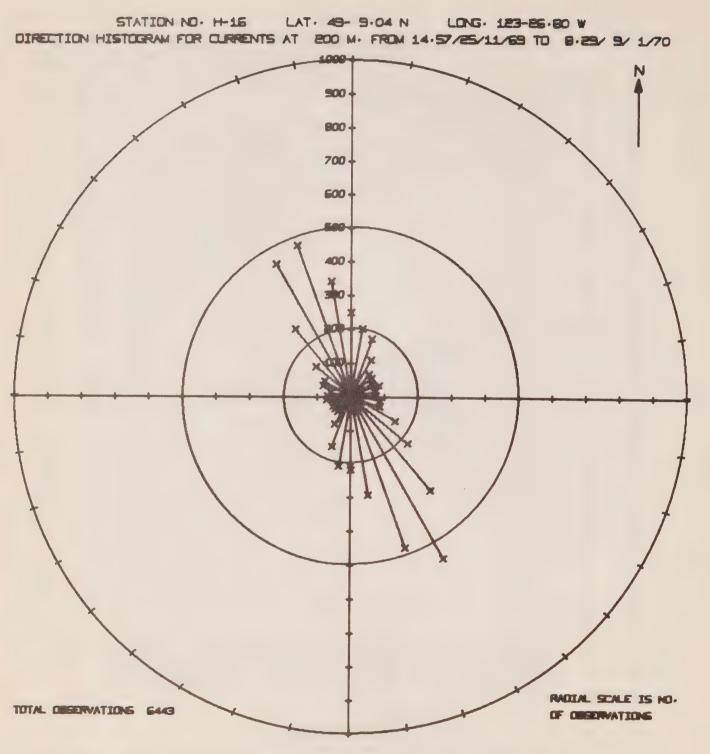


FIG. 28c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 44-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 9, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 200 METERS DESCRIVATION PERIOD, FROM 14.57/25/11/69 TO 8.29/ 9/ 1/70

Mt. NN	FREN			201	470	600	800	1000	1200	1400	1600	1800	200
Tamp.	NH.	PCT.	I	I	I	I	1	I	I	I	I	ī	
6.00	0		7										
:.05	. 0	ن	3										
0.10	Û	U	1										
r.15	0	Q.	3										
5.20	Ú	3											
H.25	0	3)										
0.30	-0	5)										
c.35	()	2	9										
F.40	7	,	-										
٧.45))	.)										
ι.50	•)		^										
55	72	1	0****										
0.66	73	1	J****										
b • 65	49	1	∩**										
5.70	193	3		***									
9.75	19	1	9****										
0.80	118	2	3*****										
4.65	119	2	0*****										
8.70	554	9	0*****	******	******								
0.95	19,0	30)*****										
9.00	1263	20	.)*****	*****									
9.05	1878	29	3***	******		*****						***********	
9.10	65	1	0										
9.15	7	9	0										
9.25	1	0	0										
9.20	: 3	o o)*										
9.35	. 0	Ĵ	2										
1.40	0	Ĵ	ń										
9.45	ő	Š	ć										
4.50	1	Š	2										
3.55	Š	Ĉ	,)										
4.60	.)	g	j j										
4.65	ő	Š	ó										
7.70	2)	ģ										
			EATER THA	N 9.70	=)	NUMB	ER OF OBSE	ERVATIONS :	6443	MEAI	TEMP = 8	3.96 DEG. (C .

FIG. 28D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 44-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 9, 1970.

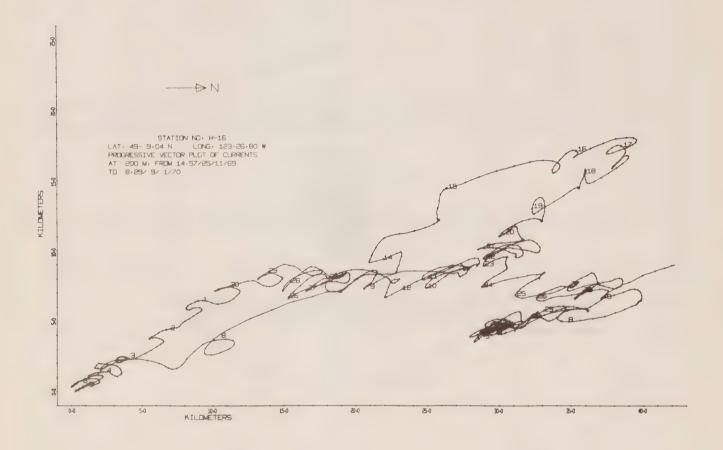


Fig. 28e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 44-day period during November 25, 1969 through January 9, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTORAM UF SPECI (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES HIST-RVATION PORTON, FROM 14-14/ 9/ 1//0 TO 3-47/20/ 2/70

M 7.7		Y DV SU		200	300	400	500	600	700	800	900	100
JPE-0	√U.	PC F.		I	I	1	1	I	1	I	1	
,	J	',	9									
10	552	.3			********	********	******	* *				
` ,	1.32	3	.)*********	****								
55	304	2)*********		******							
4.7	235	13)*********	********	********	********	********					
ن ر	411	. 7	********	********	********	******						
<i>(</i>)	029	1.	*********	*******	********	******	********	*******				
7	301	3		********	*****							
8.0	4 5 3		()*********	********	********	*********						
110	237	4		*******								
110	213	′t	.,	* * * * * * * *								
110	344	Č.			********	**						
13.	213	4										
14J	182	5			********							
140	220	3										
100	151	4	0									
170	135	2										
10)	148	2)*********									
130	135	2)******	• •								
2.3	114	2										
213	57											
2.7	71	î	,)******									
230	41		7****									
243	31	î)***									
270	٥1	ī	J###									
250	9	_	′) #									
c70	1.3	J	ı) #									
200			<i>j</i> *									
د 70	5	O.	**									
3.70	4		7									
بازد	3	J)									
320	1		j .									
viim3E3	UF SPE	eos s	REATER THAN 3	120 = U	NUM	MBER OF OBS	ERVATIONS	= 5987	MEA	N SPEED =	90 MM/S	EC

FIG. 29A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 41-DAY PERIOD DURING JANUARY 9 THROUGH FEBRUARY 20, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 14.14/ 9/ 1/70 TO 3.47/20/ 2/70

							250			
MI.AN	FREQUEN			100	150	200	250	300	350	400
DIR.	NO. PC			I	I	Ī	I	I	Ī	I
of .		3	***********		******					
, 5		2	() • • • • • • • • • • • • • • • • • • •		***					
įū		2	******							
15		2)**********							
2		2	************		****					
25	100	2)**********	*****						
30		1								
35		i	.) *********							
40		1	(10000000000000							
45		1	3*****							
50	56	1) * * * * * * * * * * *							
55		1) * * * * * * * * *							
50		1	O*****							
65		1	0 * * * * * * * * * * * * * * * * * * *							
70		1	1 * * * * * * * * * * * * * * * * * * *							
75		1)******							
80	46	1) ************************************							
85		1)=====================================							
40	37	ì								
95	64	1	() * * * * * * * * * * * * * * * * * * *							
100	44	1	0 ******							
105	39 52	1	()******							
115)******							
115 120	71	1	0							
125	71 97	2	(, , , , , , , , , , , , , , , , , , ,							
157	94	2)*********							
135	108	2)*******							
140	159	3	0*********							
145	214	4)*****							
150	187	3	0							
155	215	4	0 **********							
160	165	3	^***********							
165	162	3	**********							
170	159	3	0*********							
175	137	2	0							
180	113	2	0							
135	130	2	O*********							
190	119	2	0 *** * * * * * * * * * * * * * * * * *							
195	86	1	0							
230	44	1	0******							
ر کار	42	1	0*****							
210	62	1	() * * * * * * * * * * *							
215	46	1	0 * * * * * * * * *							
220	34	1)*****							
225	43	1	0 * * * * * * * * *							
230	20	Ú	0***							
235	18	0)****							
240	1.8	0	0****							
245	20	U	0****							
250	36	1	0 * * * * * *							
255	17	0	J***							
260	18	0	()****							
265	29	.)	0*****							
270	32	1	0*****							
275	30	1	.)*****							
280	38	1	()*******							
285	42	1	0 ******							
290	30	1	0*****							
295			7*****							
300	67	_	.) * * * * * * * * * * * * * * * * * * *							
305 310	52	-	9********							
315	81		0							
320	100		0 *********							
325	104		7*********							
330	136		0******							
335	158		0********							
340	178		O**********			**				
345	214		5*****							
350	182		0							
355	136	2	2******							
MUMBER	OF COCCE	LA T	TONS - EQUIT							

FIG. 29B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 41-DAY PERIOD DURING JANUARY 9 THROUGH FEBRUARY 20, 1970.

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W
DIRECTION HISTOGRAM FOR CURRENTS AT 200 M. FROM 14.14/ 9/ 1/70 TO 3.47/20/ 2/70

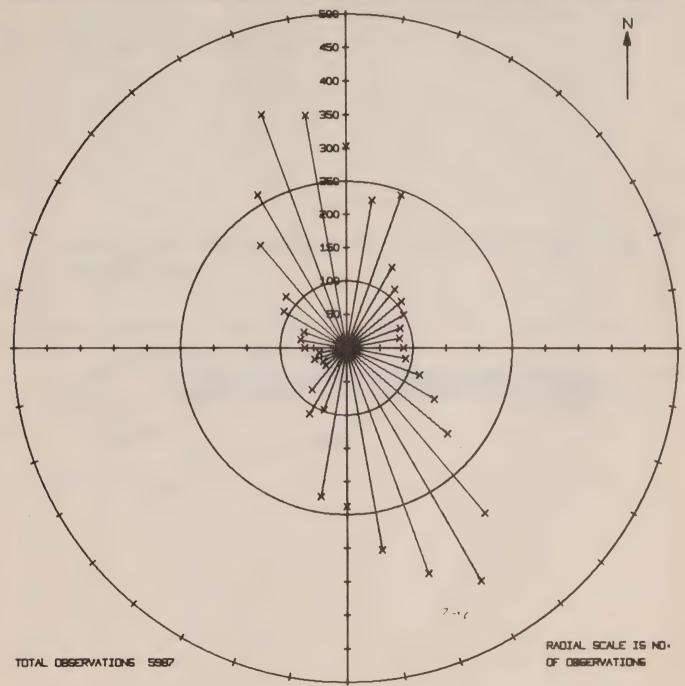


FIG. 29c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 41-DAY PERIOD DURING JANUARY 9 THROUGH FEBRUARY 20, 1970.

	e			500	1 . 0	1500	2000	2500	3000	3500	4000	4500	
MEAN		UENCY		500	1000	1500	2700	2500	3000	3300	4000	4500	50
I'MP .		PCT.)	ı	i	I .	I	ī	1	, L	ı	,	
8.00	3	j	,										
0 + 2.5	j	Ü	0										
6.10		0	7										
3.15	0												
8.20	Č.)										
0.25	0		ń										
8.30	J	U	0										
0.35	0	Ü	0										
8.40	0	,	1)										
0.45	_	J											
٤.50	U	υ 5	0										
o.55	C)										
8.60	3	ų.)										
0.65	0	-3	0										
8.70	J)											
0.75	1		0										
6.80	14	9	()										
8.85	- 68	1	(14)										
8.90	1138	19	7*****										
8.95	4463	14	0****			*******					*********	*****	
9.00	255	4	'J*****										
9.05	26	C	0.*										
9.10	12	Ú	0										
9.15	4	C)										
9.20	1	U	n n										
9.25	1	Ų	2										
9.30	7	0)										

FIG. 29D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 41-DAY PERIOD DURING JANUARY 9 THROUGH FEBRUARY 20, 1970.

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

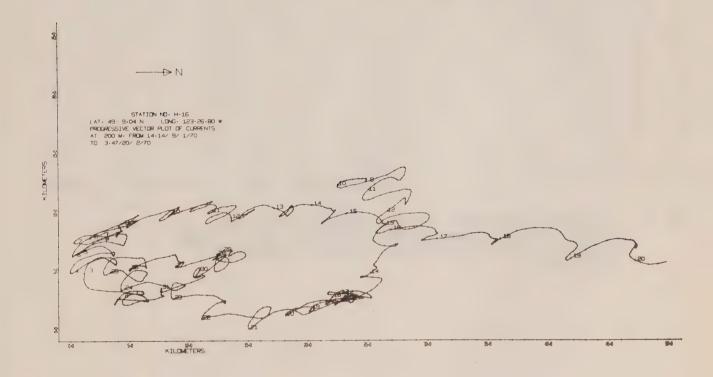


Fig. 29e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 41-day period during January 9 through February 20, 1970. The spatial scale corresponds to the displacement that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 11.52/20/ 2/70 TO 9.5/25/ 3/70

MEAN	FREQ	UENCY	J 100	200	300	400	500	600	700	800	900	1000
SPEED	· NO.	PCT.	I	I	1	I	I	1	1	I	I	I
0	0	0	0									5
10	355	1	0*********			***						·
2.0	142	3	0	F-46								
30	242	5			*							
40	529	11	O*********				********					
50	364	8	0 * * * * * * * * * * * * * * * * * * *									
60	558	12	() * * * * * * * * * * * * * *	********		*******						
70	327	7	0									
80	436	9	0 *** * * * * * * * * * *			*****	*					
90	242	5	0	********								
100	188	4	0									
110	268	6	0 * * * * * * * * * * * * * * * * * * *									
120	141	3	0*********	F #								
130	202	4	0*********	*****								
140	124	3	0********									
150	161	3	() * * * * * * * * * * * * * * * * * * *									
160	70	1	() * * * * * * *									
170	62	1	C****									
130	90	2	()*******									
190	41	1	0 * * * *									
200	70	1	O*****									
210	22	0	0++									
270	29	1	O * * *									
230	17	U	0 * *									
240	17	0	() # #									
250	23	J	0 **									
260	10)	0 *									
270	6		∩ #									
290	1	U	0									
NUMBER	OF SPE	EDS G	REATER THAN 2	280 ≖ ບ	NUM	BER OF OBS	ERVATIONS =	4737	MEA	N SPEED =	81 MM/SE	C

FIG. 30A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING FEBRUARY 20 THROUGH MARCH 25, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES DESERVATION PERIOD, FROM 11.52/20/ 2/70 TO 9.5/25/ 3/70

ME A'I	FREQUENC	Y 0 50	5 199	150	200	250	300	250	4.00
Dis.	NO. PCT			1		250	300	350	400
)	177 4				I	I	1	I	I
5	150 3		**********	*****					
10	107 2		*********						
15	56 1	O*****	* 4						
30	53 1	********	* 4						
^ 5	40 1	0 * * * * * * * * *	*						
3 🔾	50 1		*						
35	35 1	O*****							
4Ü	38 1	******							
45	31 1	O****							
50	2.1	*****							
-5									
	26 1	() # # # # #							
4.0	23 0	1)****							
65	24 1	0****							
70	50 5	O***							
75	31 1	O*****							
40	23)	1)****							
٧5	38 1)******							
20	25 1	0****							
75	20 1	() * * * * * *							
100	37 1	0******							
175	24 1	0****							
110		0*****							
	34 1								
115	44 1								
120	54 1								
125	59 1	O*******							
130	77 2)******	*****						
135	82 2	Ü*******	*****						
140	91 2	********	******						
145	131 3	14******	**********	***					
150	160 3		**********	*******					
155	144 3	0******* *		*****					
150	142 3		*********						
155			********						
170	129 3		*********	***					
175	101 2								
150	.75 2	0*******							
125	35 2)*******							
190	71 1	()*******	****						
175	51 1)********	*						
200	55 1	7********	* *						
275	43 1	^*******							
210	3 1	()*******							
215	40 1	^*******							
230	34 1	()*****							
225									
		0***							
230	19 U)***							
235	19 U	0****							
240	37 1	()******							
245	21 0	0****							
250	23 0	0****							
255	17 6	^***							
260	26 1	9****							
265	19 0	0 * * * *							
270	28 1	0*****							
2.75	14)	0***							
280	15 0	0***							
2.15		0***							
290		0*****							
	21.								
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300	. 39 1								
305	. 59 1	0******							
310	67 1	^*******							
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325	99 2)*******	******						
330	134 3		*********	***					
335	180 . 4		******		*				
340	176 4		******			`			
345	171 4		******						
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355	169 4	(7 * * * * * * * * * * *							
NII.MB = a		TIONS = 4717	•						

FIG. 30B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING FEBRUARY 20 THROUGH MARCH 25, 1970.

STATION NO. H-16 LAT. 48- 9.04 N LONG. 123-26.80 W DIRECTION HISTOGRAM FOR CLIRRENTS AT 200 M. FROM 11.52/20/ 2/70 TO 9. 5/25/ 3/70 450 400 -350 300 -200 -

FIG. 30c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING FEBRUARY 20 THROUGH MARCH 25, 1970.

TOTAL DESERVATIONS 4737

RADIAL SCALE IS NO.

OF DEGERVATIONS

FIG. 30D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING FEBRUARY 20 THROUGH MARCH 25, 1970.

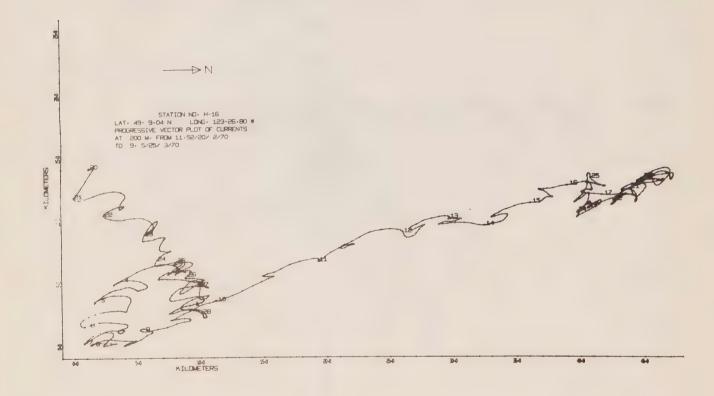


Fig. 30e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 33-day period during February 20 through March 25, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

٠,	FR- 31			2) ,	30)	400	500	600	700	800	900	100
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160	114		3									
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100	149	3) * * * * * * * * * *									
0	75	2	7******									
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FIG. 31A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MARCH 25 THROUGH APRIL 28, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 200 METRES OF SERVATION PERIOD, FROM 11.55/25/ 3/70 TO 8.39/28/ 4/70

```
FREQUENCY 0'
                                       40
                                                                                 120
                                                                                                       160
                                                                                            140
                                                                                                                  180
                                                                                                                             200
        NO.
127
DIR.
                   111
  45
50
55
60
         45
33
29
29
40
34
  65
70
75
         39
 100
 135
        89
155
 140
        119
        102
 160
         70
 180
 200
 205
 230
 235
 245
         44
 255
 265
 270
          36
 280
          31
 290
 295
         35
 300
          46
 305
 310
 315
        105
 320
         89
 330
 335
         126
 340
         123
 345
        127
         149
 355
        115
```

FIG. 31B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MARCH 25 THROUGH APRIL 28, 1970.

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W
DIRECTION HISTOGRAM FOR CLRRENTS AT 200 M. FROM 11.55/25/ 3/70 TO 8.38/28/ 4/70

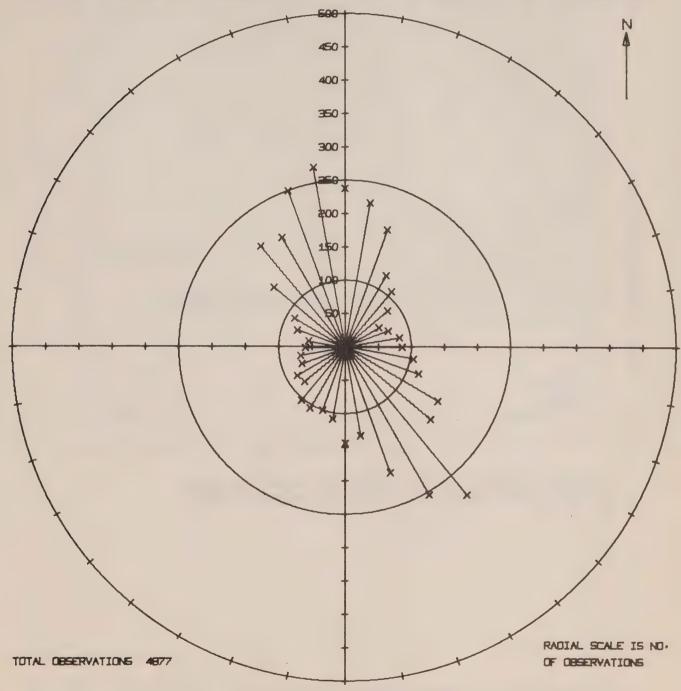


FIG. 31c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MARCH 25 THROUGH APRIL 28, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CERT.) AT A DEPTH OF 200 METERS UNSERVATION PERIOD. FROM 11.55/25/ 3/70 TO 8.39/28/ 4/70 200 500 600 400 700 800 900 1000 FREQUENCY 0 100 30.) TEMP . NO. PCT. I 7.00 7.05 7.10 7.15 7.20 7.25 7.40 7.45 7.50 7.55 7.60 1.70 7.80 7.85 7.90 7.95 6.00 h.05 n.10 331 H.15 d.20 u.25 8.30 287 230 8.35 0.40)*********************** 6.45 293 8.50 4.55 8.60 327 732 754 8.65 8.70 219 J. 75 **1** * 8.80 0+++ 8.85 3.90 8.95 9.00 9.05 0 * 9.10 4.15 9.20 0 * * 9.25

MEAN TEMP = 8.42 DEG. C.

FIG. 31d. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MARCH 25 THROUGH APRIL 28, 1970.

NUMBER OF TEMP. GREATER THAN 9.25 = 0 NUMBER OF OBSERVATIONS = 4877

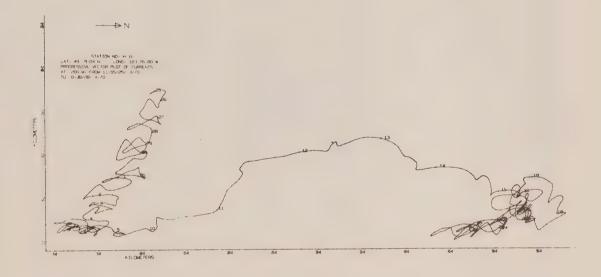


Fig. 3le. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 34-day period during March 25 through April 28, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

700 800 900 1000 NUMBER OF SPEEDS GPENTER THAN 990 = 1 NUMBER OF OBSERVATIONS = 6224 MEAN SPEED = 153 MM/SEC

FIG. 32A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 43-DAY PERIOD DURING APRIL 28 THROUGH JUNE 10, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

CLSTDGRAM OF DIRECTIDE (DEG. TREE) FOR CURRENTS AT A DEPTH OF 200 METRES DISCREMENTATION PERIOD, FROM 10.48/24/ 4/70 TO 11.55/10/ 6/70

MEAN	FREQUE	VC Y	7 ""	10)	150 - 200	250	300	350	400
::13.	1.01. P	υT.	I I	. I	I I	I	I	I	T
0		4							1
	263								
5	223	4				****			
10	201	3) * * * * * * * * * * * * * * * * * * *		***********				
15	132	2							
			``````````````````````````````````````						
2.7)	1 75	1							
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20	117	~							
3.5	43	1							
4)	2.5	1							
45	5.3	1	() * * * * * * * * * * * * * * * *						
50	53	1	*********						
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50	4.5	1	O						
65	3.7	1	7 * * * * * * *						
7.5		Ţ.	0 * * * * *						
	₄ 7								
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70	5 ₹	1							
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110	79	1							
115	117	2	.)	******					
120	123	2	-		*				
			1 **********						
125	128	2							
130	200	3	***********	* * * * * * * * * *	*************				
135	130	3		*******					
140	213	3	~*********						
145	1/5	3							
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155	1_1	2			•				
		2	*)**********						
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165	1 ) 3	2		****					
170	1.7	2							
175	d5	1	)**********						
180	63	1							
135	20	1	·						
1 +0	5.7	1	7******						
195	27	1	-						
200	32	1	Janesa						
2015	30	()	()*****						
210	26	0	1)****						
215	23	5	15 * * * * *						
220	23	0	O****						
275	31	C	<b>****</b>						
230	2.7	i)	0****						
	31	0	0*****						
235									
240	40	1	O * # # # # # # #						
245	31	0	-)*****						
250	27	0	7****						
255	29	J	0 * * * * * *						
260	24	9	0****						
265	33	1	O****						
270	۷ 7	0	)****						
275	37	1	)*****						
230	47	1	Jackschaes						
245	3.4	1	) * * * * * * * *						
270	36	1	7*****						
295	35	1	7*****						
300	36	1	7******						
305	50	1	·						
310	57	1	O*********						
315									
	46	1	]******						
320	47	1	)						
325	. 57	1	O*******						
330	+1	1	)********						
335									
	123	2	7**********						
340	171		A * * * * * * * * * * * * * * * * * * *						
345	216	3	C * * * * * * * * * * * * * * * * * * *		*******	* *			
350	251	4	7		************				
			0			*******			
355	237	4	J = F = F = F = F = F = F = F = F	*******	**********	*****			
VUMBER	DE J3SER	VATI	DNS = 6224						

NUMBER OF USSERVATIONS = 6224

FIG. 32B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 43-DAY PERIOD DURING APRIL 28 THROUGH JUNE 10, 1970.

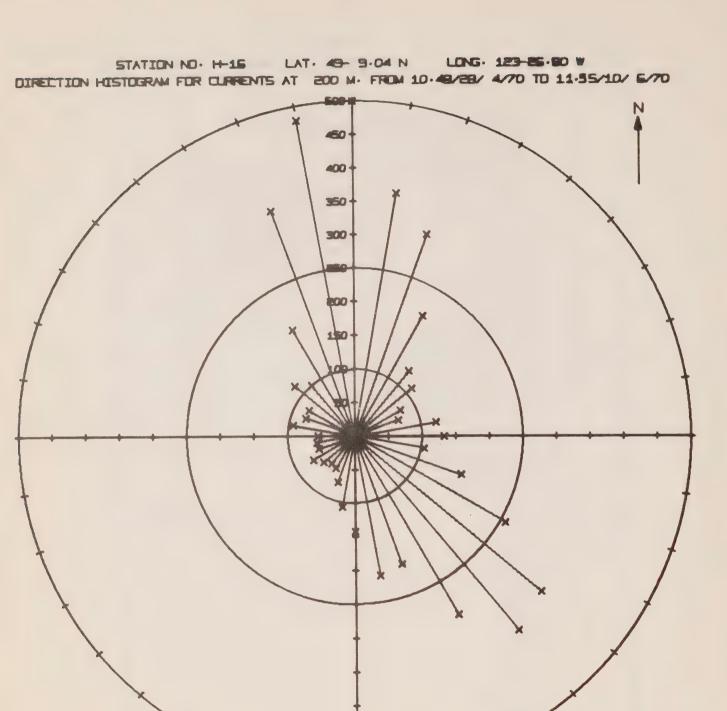


FIG. 32c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 43-DAY PERIOD DURING APRIL 28 THROUGH JUNE 10, 1970.

TOTAL DESERVATIONS SEE4

RADIAL SCALE IS NO.

OF DESERVATIONS

STATION NO. H-16 LAT. 49- 9.04 N LONG. 123-26.80 W

HISTOGRAM OF TEMPERATURE (DES. CENT.) AT A DEPTH OF 200 METERS DESERVATION PERIOD, FROM 10.43/23/ 4/70 TO 11.55/10/ 6/70

1	MEAN TEMP.		PCT.	I	200 I	4 13 I	900	800 I	1000 I	1200	1400 T	1600 I	1800
/.19													
1.25	1.15	0	ز.	1									
1.76 1.77 1.79 1.79 1.79 1.70 1.70 1.70 1.70 1.70 1.70 1.70 1.70	7.25	С		)									
.45		2	9	')									
(.50			9										
7.40	7.50			0									
7.	7.60	J.	:)										
7. 16	7.13	٠.	2	)									
7.90	1.30		J	1									
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0.10 6 0 0 1 8.15 344 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3.00	2	- 0	7									
#.70	0.10	6	-0	1									
# 30 903 15 0	8.20	724	12	9*****		********	******	*					
8.40 116 2 7 ******* 8.45 97 2 7 ******  8.50	3.30	903	15	0=====	******		********	********		********	********	*******	****
9.h0  2	3.40	116	2	) * * * * * *		***							
0.65				70000									
8.65			U										
9.75       81       1       0 *****         8.80       86       1       0 *****         8.90       14       0       0 *****         9.       1       1 ************************************	0.65		Ć.										
8.45 20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5.75	81	1										
8.75	8.35	23	0	0*									
3. % 50 1 0*** 3.10 50 1 0*** 3.115 130 2 0******* 3.20 323 5 0***********************************	8.75		1										
1.15	3.75		1										
1.25 632 10 0 *********************************	7.15	130	2	0*****									
9.35	1.25	632	10	0*****			*****						
9.45	9.35	33	1	0 * *									
1.55	7.45	0	0	1									
7.65	7.55	.0	3	)									
.75	1.65	,											
7.85	. 75												
7.95	₹.85	0	C	0									
10.05 0 0 0 10.10 0 0 0	2.95	0	U	Ç.									
	10.05	0	0	0									
		-,)		.,									

NUMBER U: : MP. GREATER INA : 10.15 = 0 NUMBER OF D J. VATIONS = 6224 MEAN TEMP = 8.50 DEG. C.

FIG. 32D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 43-DAY PERIOD DURING APRIL 28 THROUGH JUNE 10, 1970.

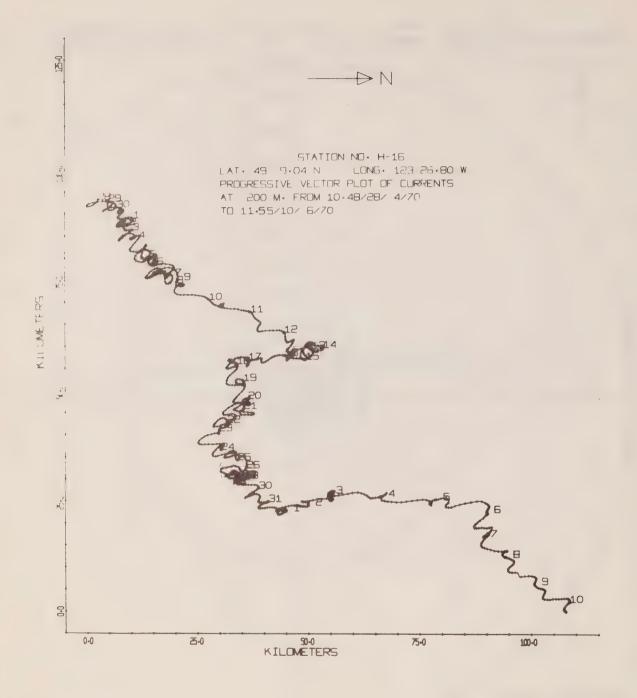
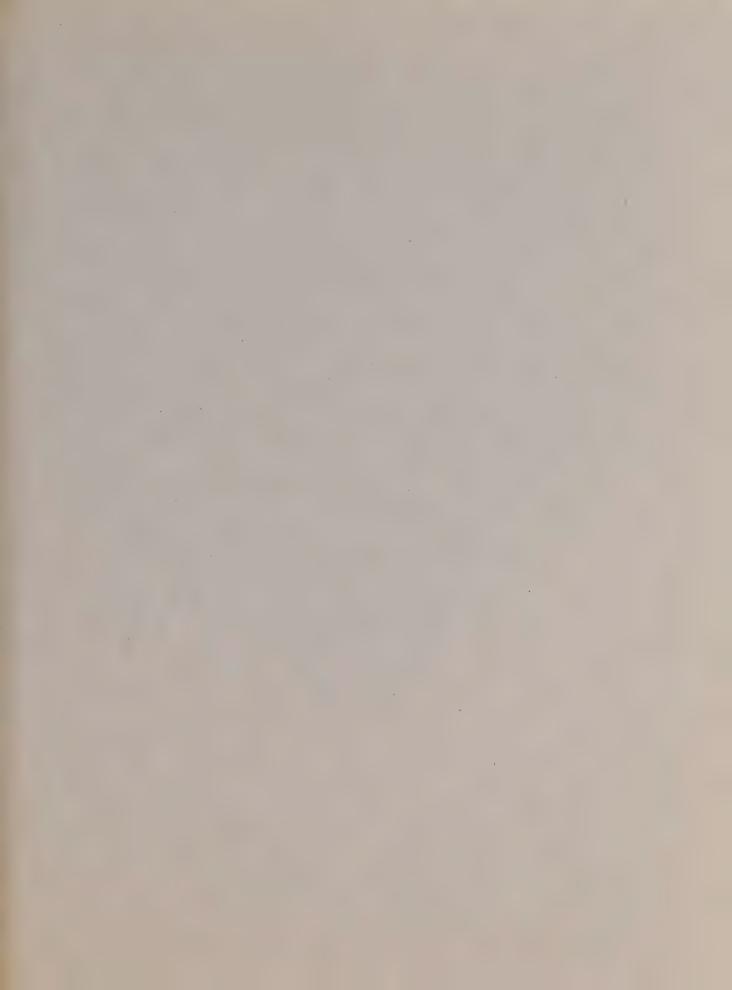


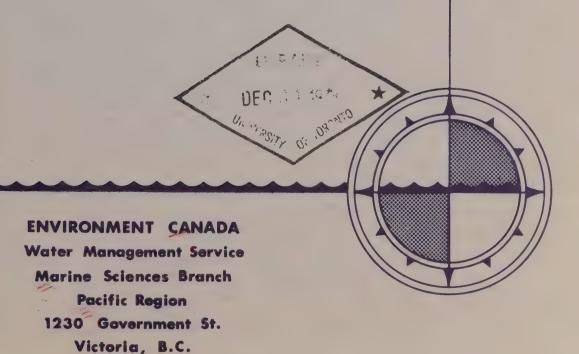
Fig. 32e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 43-day period during April 28 through June 10, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.



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SUMMARY OF OCEANOGRAPHIC RECORDS
OBTAINED FROM MOORED INSTRUMENTS
IN THE STRAIT OF GEORGIA — 1969 - 1970
Current Velocity and Seawater Temperature
from Station H-26

S. Tabata, J.A. Stickland



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MARINE SCIENCES BRANCH, PACIFIC REGION
PACIFIC MARINE SCIENCE REPORT NO. 72-9

SUMMARY OF OCEANOGRAPHIC RECORDS

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from Station H-26

by

S. Tabata and J.A. Stickland

Victoria, B.C.
Marine Sciences Branch, Pacific Region
Environment Canada

May, 1972



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## INTRODUCTION

The waters of the Strait of Georgia have been the subject of many oceanographic studies for more than half a century. The earlier studies of the region consisted mainly of physical, chemical and biological oceanographic descriptions of the waters and some of the main factors affecting the properties of the waters therein. The studies vary, in scope, from a brief initial description of the waters by Fraser and Cameron (1916) and a more detailed work by Hutchinson and Lucas (1931) and to a more complete treatment by Waldichuk (1957), to name a few.

In spite of the number of oceanographic studies made on these waters there was a notable lack of reliable information of the surface and subsurface circulation in the Strait. In order to relieve this deficiency, the Pacific Oceanographic Group embarked on a limited program of current velocity observations in the central portion of the Strait of Georgia. The initial observations consisted only of surface drift measurements, the results of which have already been reported (Giovando and Tabata, 1970) and a series of velocity profile measurements from anchored vessels, the results of which have also been reported (Tabata, Stickland, Wong and Giovando, 1970 (a); 1970(b); 1970(c)).

In recent years the marine technology associated with automated oceanographic observations from moored instruments has advanced to the stage where it is now possible to obtain reliable data from unattended instruments for periods exceeding one month. The present series of observations to be reported here are based on data obtained from such instruments.

The primary objective of the present program of observations is to obtain current velocity records at sufficiently high frequency and of sufficient length so that it would be possible to examine the spectrum of the variability of current velocities in the frequency band between 1 cycle and  $10^{-3}$  cycle per hour (period of few hours to few months approximately), at a representative area of the central Strait. Such data would provide, in addition to basic scientific information, solid background material that would be useful in a variety of applied oceanographic studies such as those associated with pollution and fisheries. As most of the instruments employed recorded temperatures of the water as well as current velocities, they too are reported.

A report describing the observational program, performances of current meters used, mooring technique, computer data-processing method, etc. has already been published in the Technical Report Series of the Fisheries Research Board of Canada (Tabata, Stickland and de Lange Boom, 1971). The summaries of observations obtained from Stations H-06 and H-16 have already been published in Pacific Marine Science Reports No. 72-7 and 72-8 respectively (Tabata and Stickland, 1972).

The present report comprises the summary of current velocity measurements obtained from Station H-26. It is the fourth of a series of reports associated with the program of oceanographic observations from moored instruments in the Strait of Georgia to be issued.

## The summary contains:

- 1) histogram of current speed
- 2) histogram of current direction
- 3) histogram of current direction in polar form
- 4) histogram of temperature (if applicable)
- 5) progressive vector diagram of current velocities

Local standard time, Pacific Standard Time (P.S.T.), is used throughout (time zone + 8).

#### BACKGROUND INFORMATION

The only current measurements made in the open waters of the Strait, prior to 1953, were by means of drift bottles. They were carried out under the direction of Dr. W.A. Clemens. The data so obtained have been used later to interpret the surface circulation in the Strait of Georgia, (Waldichuk, 1957; Waldichuk, 1958).

In 1953, for the first time in the Strait, current observations were made at 8 fixed locations in the Strait from an anchored ship (Waldichuk, 1957). They were generally taken at hourly intervals at selected depths for a period of one tidal day (25 hours) at each station. While surface currents were observed by means of a customary captive drift pole, subsurface currents were measured with an Ekman Current Meter.

A year later, a series of 6 stations was occupied between Tsawwassen and Galiano Island (Fig. 1) and surface and bottom currents were measured for one tidal day at each of the stations (Pickard, 1956). The surface currents were observed at half-hourly intervals utilizing a drift pole while the bottom currents were measured with an Ekman Current Meter at hourly intervals.

During the summer of 1963 a series of 3 stations in a line between Nanaimo and Sechelt (Fig. 1) was occupied by the Canadian Hydrographic Service and currents were measured at depths of 5, 100 and 300 metres (m) with self-recording BBT (Neyrpic) current metres (analogue output) at each of these stations at 20-minute intervals for period up to 30 days (Huggett, 1966). The method used to obtain the data represents a significant improvement over previous methods. However, even when currents were measured in this manner, the results indicated inconsistency in the day-to-day flow patterns although the 15-day averages did indicated the presence of clockwise rotary tidal currents.

## LOCATION OF STATIONS

A line of 3 stations, H-06, H-16 and H-26, placed 10 kilometres (km) apart, was established between Valdes Island to the west and Point Grey to the east in April 1969 (Fig. 1). They remained stationed until the completion of the survey in September 1970. As is evident from Fig. 2, the western half of the line is deeper than the eastern side, the maximum depth being located a few kilometres east of Station H-06. The small ridge shown to the east of Station H-16 is part of a shoal having a minimum depth of 146m and situated within a few kilometres to the southeast of the ridge shown in the Figure.

The positions* and the depths of the 3 stations are:

H-06	Latitude 49°06.23'N
	Longitude 123° 33.70'W
	Depth 252m

H-16 Latitude 49° 09.07'N Longitude 123° 26.75'W Depth 295m

H-26 Latitude 49° 11.93'N Longitude 123° 19.80'W Depth 162m

^{*} The exact locations of these stations are generally within one-half mile of those indicated above.

#### COMMENTS

## Station H-26

## Subsurface-Buoy Mooring

April 16 through May 15, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 102)

29-day period. No comment.

140m Aanderaa Current Meter (Serial No. 101)

29-day period. No comment.

May 15 through June 18, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 102)

34-day period. No comment.

140m Aanderaa Current Meter (Serial No. 101)

31-day period. Clock inoperative when meter retrieved. Sampling rate assumed to be same

as during previous observations.

Note: Bathythermograph observation and hydrographic cast made at 1223 on May 23, 1969.

June 18 through July 10, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 102)

22-day period. No comment.

140m Aanderaa Current Meter (Serial No. 101)

22-day period. No comment.

July 10 through July 24, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 102)

14-day period. No comment.

140m Aanderaa Current Meter (Serial No. 101)

14-day period. Meter damaged extensively.

Note: Mooring snagged by tug boat with tow. Mooring dragged 4 miles to north. Inspection of data indicated accident occurred during 2040 through 2050 on July 24, 1969.

August 28 through September 18, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 102)

21-day period. Upon inspection of this meter at later date found "orientation stud" of meter reversed. This would give current directions that would be reversed. All directions recorded during August 28 through April 27, 1970, have been corrected to read correct directions.

140m Aanderaa Current Meter (Serial No. 101)

21-day period. No comment.

Note: Gap of one month present between start of this series of measurements and end of previous series.

COMMENTS (cont'd)

September 18 through October 16, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 102)

28-day period. See previous comment regarding

this meter.

140m Aanderaa Current Meter (Serial No. 101)

28-day period. No comment.

October 16 through November 25, 1969.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 102)

40-day period. See previous comment regarding

this meter.

140m Aanderaa Current Meter (Serial No. 101)

40-day period. No comment.

Note: Bathythermograph observation and hydrographic cast made at 0905 and 0910 respectively on November 25, 1969.

November 25, 1969 through January 9, 1970.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 102)

45-day period. See previous comment regarding

this meter.

140m Aanderaa Current Meter (Serial No. 101)

15-day period. Clock inoperative when meter retrieved. Sampling rate assumed to be same

as during previous observations.

January 9 through February 19, 1970.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 101)

14-day period. Clock inoperative when meter retrieved. Sampling rate assumed to be same

as during previous observations.

140m Aanderaa Current Meter (Serial No. 102)

14-day period. See previous comment regarding

this meter.

February 19 through March 25, 1970.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 97)

34-day period. No comment.

140m Aanderaa Current Meter (Serial No. 102)

34-day period. See previous comment regarding

this meter.

March 25 through April 27, 1970.

Instrument Depth: 50m Aanderaa Current Meter (Serial No. 97)

33-day period. No comment.

140m Aanderaa Current Meter (Serial No. 102)

33-day period. See previous comment regarding

this meter.

COMMENTS (cont'd)

## Taut-Rope Mooring

April 28 through June 19, 1970.

Instrument Depth: 3m Geodyne*Current Meter (Serial No. M-187)

52-day period. This meter was lifted out of water for one minute inspection at 0910 on

May 22, 1970.

50m Aanderaa Current Meter (Serial No. 97)

52-day period. No comment.

June 19 through July 28, 1970.

Instrument Depth: 3m Geodyne Current Meter (Serial No. M-187)

39-day period. No comment.

50m Aanderaa Current Meter (Serial No. 98)

39-day period. No comment.

July 28 through

Instrument Depth: 3m Geodyne Current Meter (Serial No. M-187)

9-day period. This meter was fouled by

fishing net on August 5, 1970.

50m Aanderaa Current Meter (Serial No. 99)

Meter failed due to leaking cylinder case.

No data available.

^{*}It is to be noted that while the Aanderaa (Bergen) Current Meter used in the present program was made to sample every 10 minutes, the Geodyne Current Meter was set to "burst-sample" every 15 minutes (that is, every 15 minutes it recorded 15 samples at 5-second intervals).

## ACKNOWL EDGEMENT

The acquisition of, and the processing of oceanographic data obtained from moored instruments require the assistance and cooperation of many individuals and groups. We acknowledge the assistance rendered by the staff of the Nanaimo Biological Station of the Fisheries Research Board of Canada, of the Pacific Oceanographic Group of the Marine Sciences Branch (now at the Pacific Environment Institute at West Vancouver, B.C.), of the Tidal and Current Survey of the Marine Sciences Branch and the officers and men of the research vessels, C.G.S. Parizeau (M.S.B.), C.G.S. Vector (M.S.B.) and C.G.S. A.P. Knight (F.R.B.C.). Individuals associated with the above were duly acknowledged in our first report. Since the publication of the first report in 1971, a number of people have assisted in the computerprocessing of data and in the preparation of illustrations. We appreciate the generous assistance given by Mr. J.A.C. Thomson and Mrs. A. Sandnes of the Computing Centre at the Nanaimo Biological Station, Messrs. B. de Lange Boom and I. Daniel who processed the data, Miss T.A. Findlay who prepared the illustrations, and Mr. C. Morley of the Nanaimo Biological Station and Mr. R. Banvard of the Canadian Hydrographic Service of the Marine Sciences Branch who photo-reproduced all the illustrations. We owe our thanks to Miss M. Dyer for organizing and making the preparatory work essential to the publication of this report.

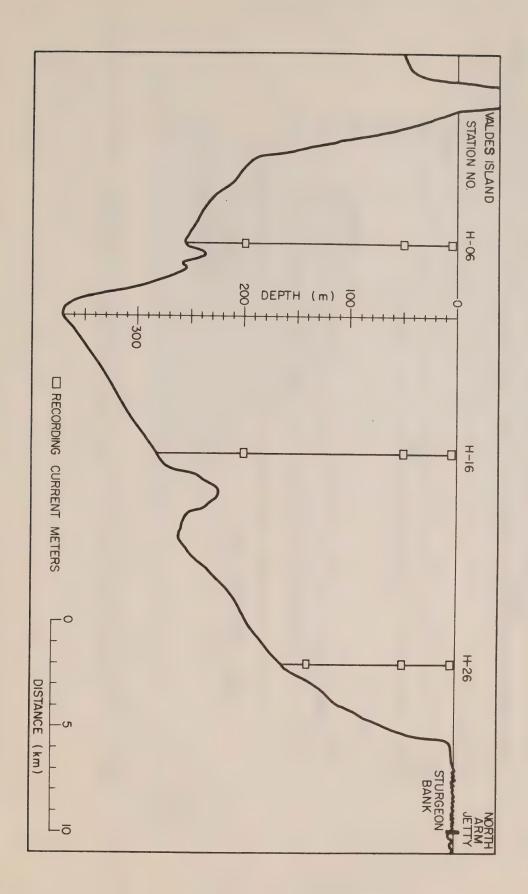
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  Current velocity measurements in the Strait of Georgia 1967. Fish.

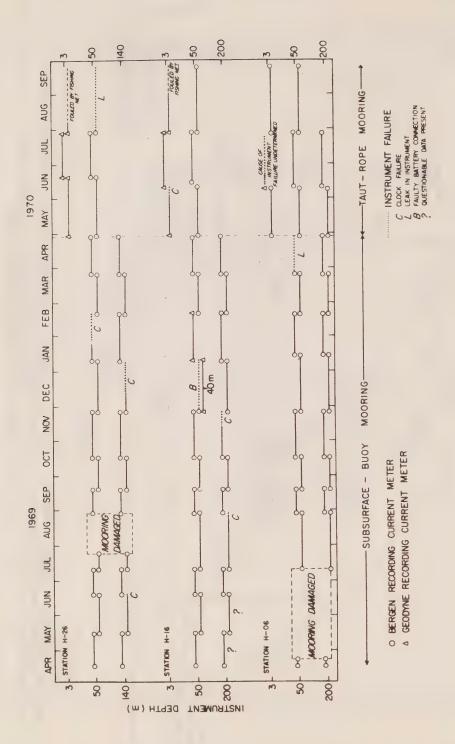
  Res. Bd. Canada Tech. Rept. 169. 245 p.
  - MS, 1970 (b). Current velocity measurements in the Strait of Georgia 1968. Fish. Res. Bd. Canada Tech. Rept. 178. 112 p.
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  - MS, 1972. Summary of oceanographic records obtained from moored instruments in the Strait of Georgia -- 1969-1970. Current velocity and seawater temperature from Station H-16. Marine Sciences Branch, Pacific Region. Pacific Marine Science Report No. 72-8. 144 p.
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- Waldichuk, M. 1957. Physical Oceanography of the Strait of Georgia, British Columbia. J. Fish. Res. Bd. Canada 14: 321-486.
  - 1958. Drift bottle observations in the Strait of Georgia. J. Fish. Res. Bd. Canada 15: 1065-1102.

The records Location of stations in the central Strait of Georgia where observations were made. described in this report were obtained at Station H-26.



Cross-section along the line of stations H-O6, H-16 and H-26, between Valdes Island and Point Grey. The records described in this report were obtained at Station H-26.

Fig. 2.



Schematic drawing showing summary of events that occurred during the program of observations during 1969-1970. The records described in this report were obtained at Station H-26.

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 TOTAL LUMBER OF INPUT DATA & 63979 ANTH AVERAGE VALUE # 57498
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TO 73: 11 43: 11+21+05

NUMBER OF CANADANINA DEEDOS = 1

NUMBER OF CHECKSUF 144805 = 0

DUB NOV 10102 JUL 22470
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NUMBER OF DATA OUT OF RANGE .
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FIG. 4B. A HISTOGRAM OF DIRECTION ("TRUE), WITH CLASS INTERVAL OF 5", FROM RECORDS
OSTABLED AT 10-MINUTE INTERVALS OVER 52-DAY PERIOD DURING APRIL 28 IHROUGH
MINE 19 (770)

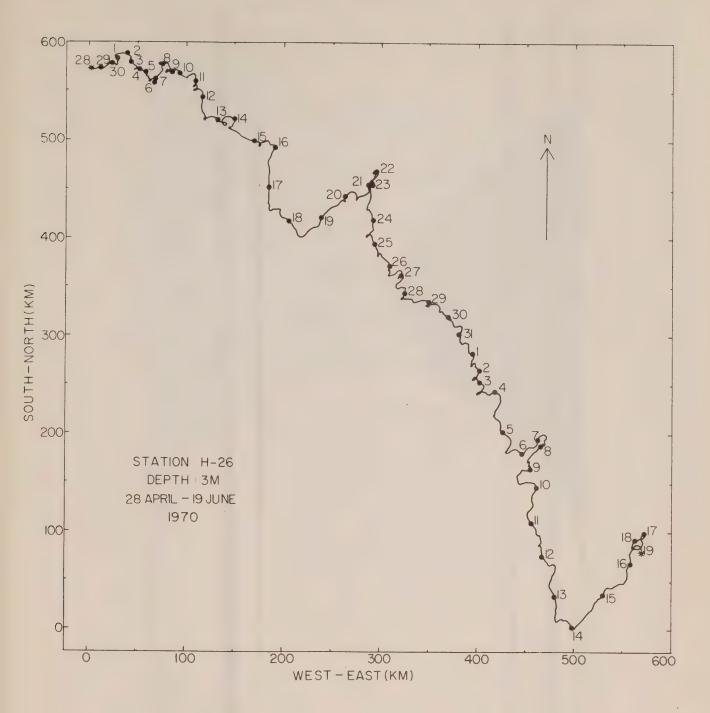


Fig. 4c. A progressive vector diagram constructed form successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 52-day period during April 28 through June 19, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

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16. Sa. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERNAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERNALS OVER 39-DAY PERIOD DURING JUNE 19 THROUGH JULY 28, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

NUMBER OF DATA OUT OF RANGE 
SPANNING RANGE
FROM 700 VI -19 13-0000
TO 700 VII-20 12-15-05

NUMBER OF NON-STANDARD RECORDS O NUMBER OF CHECKSUM ERRORS O 0

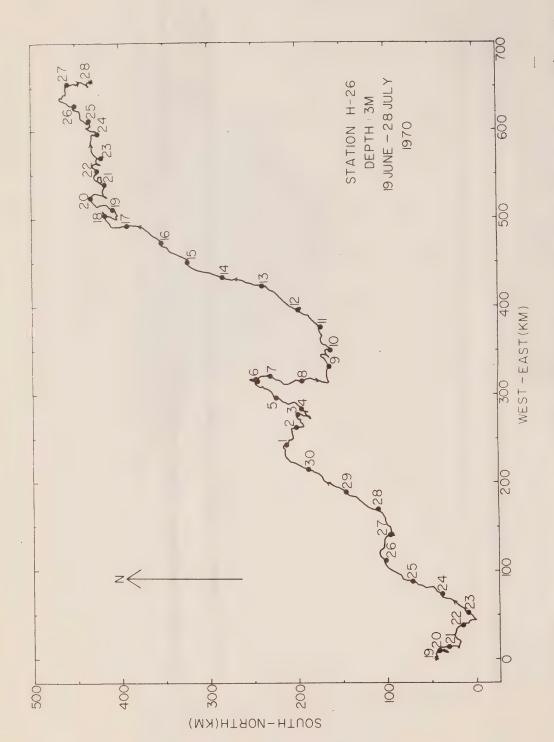
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DATA/ NAMBS87// NAM
 DATA/ NAMB187/6 / DIRECTION
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346
448
241
294
281
 38866400743
28867774
3887774
 1279341704829
1284829
1284889
12929
12929
 100
83
90
88
 TOTAL NUMBER OF INPUT DATA . 52320 . TTH AVERAGE VALUE .
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NUMBER OF DATA BUT OF RANGE . C

SPANNING RANGE FROM 700 VI 419 13040000 70 700 VII-28 12015005



June 19 through July 28, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 39-day period during as at this location.

Fig. 5c.

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3474/ 44"187/5 / SPEED
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 840 P. ..
 :....
TOTAL NUMBER OF INPUT DATA . 9655 ARITH AVERAGE VALUE 0 60-80 CM/SEC
 NUMBER OF DATA OUT OF SANUE 4 303
 NUMBER OF AGNOSTANDARD RECORDS & CHUMBER OF CHECKSUM ERRORS &
 J88 END/ 18110 JA - 05/171
```

FIG. 6A. A HISTOGRAM OF SPEED (MMYSEC), WITH CLASS INTERVAL OF 10 MMYSEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 9-DAY PERIOD DUBLING JULY 28 THROUGH AUGUST 5, 1970. SPEED LESS THAN OR EQUAL TO 10 MMYSEC IS CONSIDERED TO BE "ZERO SPEED".

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DATA/ NAM187/5
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 9855 JAITH AVERAGE VALUE * 167-77
 DEGREES
 NUMBER OF DATA BUT OF RANGE &
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A HISTOGRAM OF DIRECTION ("TRUE), WITH CLASS INTERVAL OF 5", FROM RECORDS
```

OBTAINED AT 10-MINUTE INTERVALS OVER 9-DAY PERIOD DURING JULY 28 THROUGH AUGUST 5, 1970.

FIG. 6B.

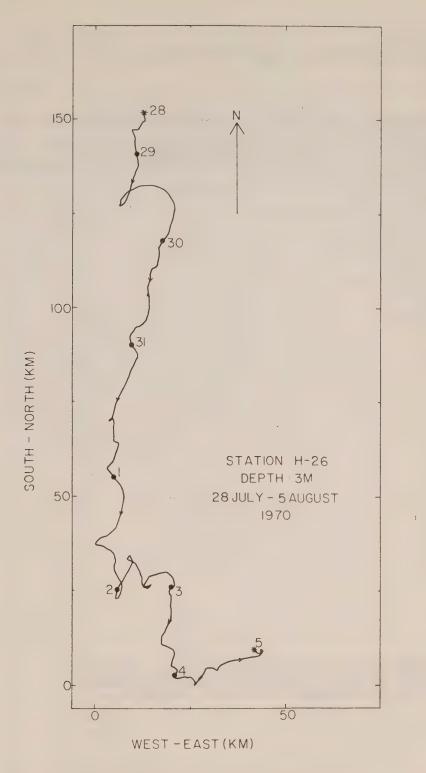


Fig. 6c. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 9-day period during July 28 through August 5, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

STATION NO. H-26 LAT. 49-11.86 N LONG. 123-19.83 W

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES UBSERVATION PERIOD, FROM 11.25/16/ 4/69 TO 11.15/15/ 5/69

MLAN SPEED O	FREQU NO.	ENCY PCT.		100 I	150 I	200 I	250 I	300 I	350 I	400 1	450 I	500 I
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20	148	4	()*******									
30	240	6	0 *********									
40	457	11	0 *********	• • • • • • • • • • • • •	• • • • • • • • • • •			• • • • • • • • • •	********	********	******	
50	327	g	0 * * * * * * * * * * * * * * * * * * *		******		• • • • • • • • • • • • •					
40 70	436	10	0 **********		• • • • • • • • • • • • • • • • • • •			• • • • • • • • •		*******	****	
A)	274	7	0 ***********									
90	154	4	0					•				
100	107	3	0 *** * * * * * * * * * * * * * * * * *	*******								
110	186	4	0 *** * * * * * * * * *	*********								
120	116	3	0	**********								
130	136	3	0,		***							
140	83	2	0 *** * * * * * * * * * * * * * * * * *									
150 160	124 71	3	0*********		••							
170	82	2	0 * * * * * * * * * * * * * * * * * * *									
180	111	3	0********									
190	65	2	0 *********									
200	97	2	3*********									
210	4.9	1	0 * * * * * * * * *									
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370	1	0	Ö									
380	0	0	0									
390	0	O	0									
400	1	0	0									
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FIG. 7A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 11.25/16/ 4/69 TO 11.15/15/ 5/69

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225
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 12
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 230
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 235
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 26
 0****
 285
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 295
 0***
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 0 * * *
 305
 0****
 310
)*****
 115
 28
 320
 32
 330
 335
 71
 340
 81
 345
 147
 350
 139
 224
```

NUMBER OF OBSERVATIONS = 4178

FIG. 7B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969.

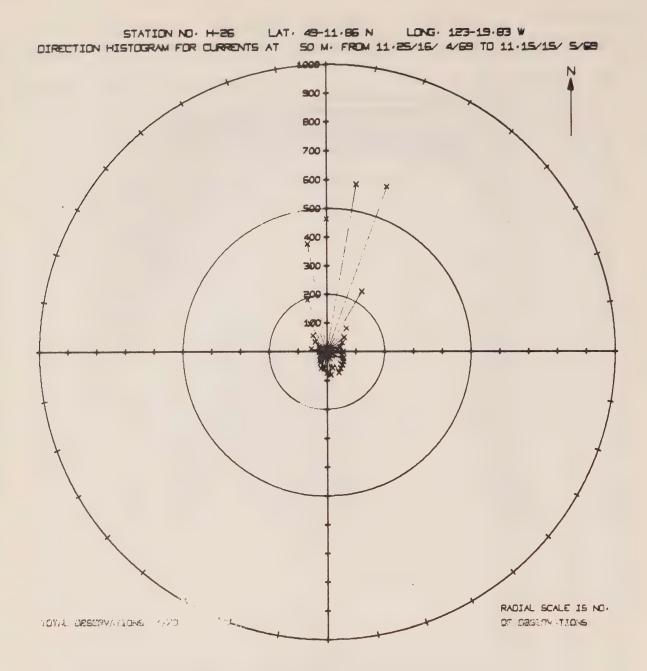


FIG. 7c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969.

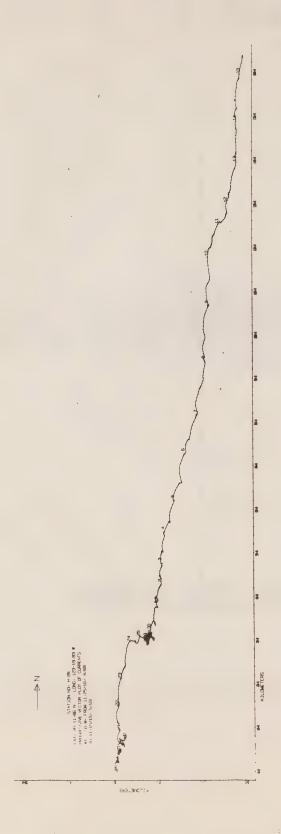
HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS OBSERVATION PERIOD, FROM 11.25/16/ 4/69 TO 11.15/15/ 5/69

MCAN	FREQU			50	100	150	200	250	300	350	400	450	500
6.30	NO. 0	PCT.	0	1	,	I	I	I	I	I	I	1	I
6.05	0	Ü	0										
0.10	ä	0	Ü										
6.15	0	ō	0										
6.20	С	0	0										
6.25	0	O	7										
6.30	0	C	0										
6.35	0	0	2										
6.40 0.45	0	0	0										
6.50	0	Ü	0										
6.55	0	ő	0										
6.60	0	0	n										
6.55	0	0	0 '										
6.70	)	O	0										
6.75	1	0	0										
6.80	0	0	0										
5.35 6.90	1 2	O.	0										
5.95	59	1	)******										
7.00	112	3											
7.10	131	3											
7.10	272	7	7 * * * * * * *	*****	* * * * * * * * * * *		********		•				
7.15	370	9	O*****	*****		********	********	• • • • • • • • • •	*******	•••••			
7.20	235	0	() * * * * * * *				********	***					
7.25	416 285	10	7 * * * * * * *				*******		********	******			
7.30 7.35	431	13	7*****										
1.40	463	11	,				*********						
7.45	312	7	)*****						******				
7.50	209	6	) * * * * * * *	*****			********		*				
7.55	184	4		*****		********	****						
7.50	22	1	0****										
7.65 7.70	81 73	2	()******										
7.75	73	2	0 *** * * * *										
7.80	57	1	0										
7.85	52	1	0 *****										
7.90	24	1	0 * * * * *										
7.95	56	1	0*****										
8.00	52	1	0 *** * * * *										
8.05	63	2	0*****	*****									
8.10	32 32	1	0 * * * * * *										
8.15 8.20	17	0	0***										
17.20													

NUMBER OF TEMP. GREATER THAN 8.20 = 0

NUMBER OF OBSERVATIONS = 4178 MEAN TEMP = 7.38 DEG. C.

A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS FIG. 7D. OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969.



would occur if the motion in the entire neighboring area of the location of the instrument was the same A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 29-day period during April 16 through May 15, 1969. The spatial scale corresponds to the displacement of the water that as at this location.

Fig. 7e.

STATICA NO. H-26 LAT. 49-11.50 V LONG. 123-17.83 W

#15TT RAM OF SPECO (MM/SEC) FOR CHRRISTS AT A DEPTH OF 50 METRES 1 STRANTION PURIOS, FOR 13.457157 5703 TO 11.357187 5769

A V1		UENCY		201	30.0	400	500	6.10	700	800	900	1000
SPalu.		DCI.		1	I	I	1	I	I	Ī	I	1
3	7	- 3	٦									
13		C		****	•							
20	95	2										
	157	5		****								
4.3	4/3	9		****		******						
	344	7	~*****	****		#						
~0	:22	11	) * « * * * * * * *	*****		*******	******					
7)	244	5		********	•							
1.3	371	본	()*******	*****	******	***						
<b>3</b> 0	233	5	) * * * * * * * * *	****	*							
1.13	239	خ	)********	*********	<b>3</b>							
110	305	6	)********	**********	******							
150		4		中でに対象を要求								
: 30	3 4 1	t		*********	*****							
4.7	.71	4		*****								
:50	5	>		********								
120	110	2	)*****	*								
170	34	2	)*******									
: 33	143	٤		****								
. 3.)	7 H	2	J*******									
1;	113	2		* *								
(1)	14	1										
4.73	63	- 1	******									
13,	30	1	J # + #									
4.7	25	1	J***									
;	47	1	1 * * * %									
. 17.3	3	1										
75	1 +		0 * *									
6.50	3	- 1										
. 10	3	j	1									
. 13	4	i i										
:10	I											
11)t ==	تام عل	205 3	CONTRACT THAC	5 4 N =	<b>∿</b> UM	BER OF DES	ERVATIONS	= 4866	MEA	N SPEED =	98 MM/S	EC

FIG. 8A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MAY 15 THROUGH JUNE 18, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURPENTS AT A DEPTH OF 50 METRES INSERVATION PERIOD, FROM 13.45/15/ 5/69 TO 11.35/18/ 6/69

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FREQUENCY O
 100
MLAN
 50
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 400
DIO.
 NO.
 PCT. I
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 1.7
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 7 . . .
 16
 35
 3****
 0 * * *
 19
 110
 0 ****
 115
 2****
) * * * *
 1.25
] ()******
 36
 230)
135
 .) * * * * * *
 36
 .) ******
 145
 1 ()*********
15)
155
)
) *********
 150
 165
 170
) * * * * * * * *
 45
 .75
180
 2*******
) *****
 0+++
200
205
)
 1)-#
 12
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)##
230
 0 *
235
 11
 9##
 0++
240
 10
 0 ...
 10
24:)
265
270
 11
) # #
 0 5*
280
 0 **
 16
290
4 35
 19
 0 0 ***
 375
 O * * * * *
 0 ******
 310
 35

 56
 78
 117
 340
 19)
 345
 197
350
 O*************
 190
355
 268
```

+UMMER UF UBSERVATIONS ≈ 4866

FIG. 8B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MAY 15 THROUGH JUNE 18, 1969.

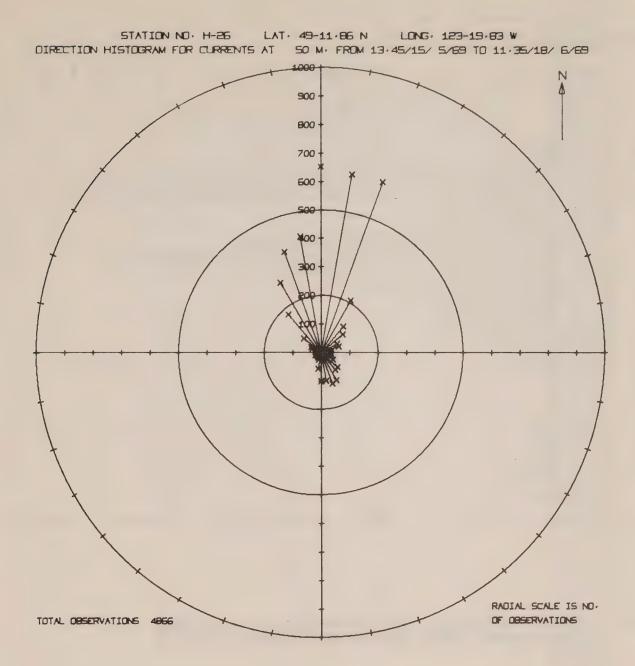
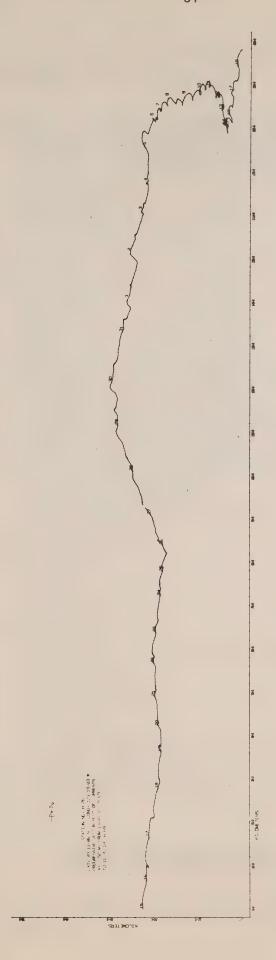


FIG. 8c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MAY 15 THROUGH JUNE 18, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS DESCRIVATION PERIOD, FROM 13.45/15/ 5/69 TO 11.35/18/ 6/69

HLAN	FREQUE					200	250	300	350	400 I	450 I	500
7.00	, ,	CT.	1	I I	1	I	I	I	I	4		1
7.05	0		o									
7.10	ő		0									
7.15	0		0									
7.20	0	0	ŋ									
7.25	23	U	)****C									
7.30	18		0****									
7.35	40		0******									
7.40	220					• • • • • • • • • • • • • • • • • • •						
/.45 /.50	432									*******		
7.55	4.0		0******							*******	• • •	
7.50	95		0 *******									
7.65	206		·									
7.70	134	3	0	• • • • • • • • • • • • • • •								
1.75	. 223	5	0	• • • • • • • • • • • • • • • •		• • • • • • •						
7.30	290	6	,	************	**********	• • • • • • • • •	******					
1	200				· · · · · · · · · · · · · · · · · · ·		*****					
7.90	398 249		0									
7.95 8.00	168	_	0									
8.05	179		0									
8.10	149		0 ** * * * * * * * * * * * * * * * * *									
3.15	143		3 *** * * * * * *	• • • • • • • • • • • • • • •								
8.20	117	2	0	**********								
8.25	108		0									
3.30	62	-	0 *******									
8.35	54		0	* *								
8.40	43 62	_	0 * * * * * * * * * * * * * * * * * * *	***								
8.50	14		0 ***	***								
8.55	6		0*									
2.60	7	0	*									
55	٦	· ·	* *							1		
8.70	2		0									
8.75	19		0 * * * *									
8.85	20 32		0++++									
8.90	16	_	0***									
8.95	18		3***									
9.00	33	_	0*****									
9.15	39		0++++++									
9.13	3		0 =									
9.15	23	0	0****									
NUMBER	OF TEMP.	GRE	ATER THAN	9.15 = 0	NUMBER D	F OBSERVAT	IONS =	4866	MEAN	TEMP = 7	.83 DEG. C	•

FIG. 8D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING MAY 15 THROUGH JUNE 18, 1969.



components of current velocity from records obtained at 10-minute intervals over 34-day period during May 15 through June 18, 1969. The spatial scale corresponds to the displacement of the water that would A progressive vector diagram constructed from successive cumulative values of north-south and east-west occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

Fig. 8e.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 14-15/18/ 6/69 TO 13-39/10/ 7/69

MLAN SPEED	NO.	UENGY PCT.	1	50 I	100 I	150 I	200	250 I	300	350 I	400 I	450 I	500 1
0 10 20	0 186 149	Ú 6 4	0										
30 40 50	208 438 289	14	)			• • • • • • • • •				•••••		****	
60 70	389 223	12	() * * * * * * *			• • • • • • • • •		••••••	•••••	•••••	••••		
90	289	9	1)	*****		****		•••••	****				
100 110 120	152 155 91	5 5 3											
130	79 43	3 2	0										
15J 160	58 46	2	0										
170	33 47	1 1	0										
170 200 210	33 44 20	1	0										
220	24	1 0											
240 250	5	0	0 •										
260 270 280	1	0	ი ი ა										
290	2	0	2										
310 320	C 2	0											
330 340 350	0 0	) 0 0	0										
360 370	0	3	é o										
۶۹0 ۲۵۵	. 0	2	2										
403 410 423	3	0	ი ი ი										
430	0	Ü	0										
450 460	0	0	2										
470 430	0	0	0										
490 500 510	0 0	0	0										
520	0	O U	0										
540 550	0	0	0										
560 570 580	0 0	0	0										
570	0	0	0										
610 520	0	0	0										
630 640 650	0	0	2										
663 673	0	0	0										
680 690 700	0	0	0 0 0										
710 720	0	0	0										
730 740	0	0	0										
750 760 770	0	C	0										
780 790	0	0	0										
800 #13	0	0	0										
820 830 840		0	0										
				HAN 8	40 = Q	NU	MBER OF OBS	SERVATIONS	= 3155	MEA	N SPEED =	75 MM/S	EC

FIG. 9a. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES JBSERVATION PERIOD, FROM 14.15/18/ 6/69 TO 13.39/10/ 7/69

```
MEAN
 FREQUENCY O
 20
 40
 60
 100
 120
 140
 160
DIR.
 NO.
 103
 10
 91
 20
 25
36
 107
 36
29
 35
 40
 35
 50
 29
 55
 0 * * * * * * * * * * *
 22
 60
65
70
 25
13
 0 ******
 10
 20
 80
 () * * * * * * * * *
 18
 85
90
 11
)*****
 13
 0 ******
 95
 0 * * * * * * * * * *
 100
 12
 0*****
 105
 115
 17
 0 *******
 125
125
130
 0
 0***
 11
 0
 18
 135
 140
 20
 145
 54
 150
 155
 106
 160
 94
 93
 165
 170
 82
 175
 180
 101
 185
190
 92
59
 195
 57
 200
 205
 210
 47
 215
 220
225
 49
 27
 230
 38
 235
 23
 240
 19
25
 245
 250
 255
 25
 260
 21
 265
 13
 270
 275
 23
 0*********
 280
285
 26
 29
 290
 38
 295
 300
 305
 310
 27
 0 * * * * * * * * * * * * * * * * *
 315
320
 26
 30
 325
 33
 330
 62
 335
 340
 64
 345
350
 53
 66
 355
```

NUMBER OF OBSERVATIONS # 3155

FIG. 9B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 10°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969.

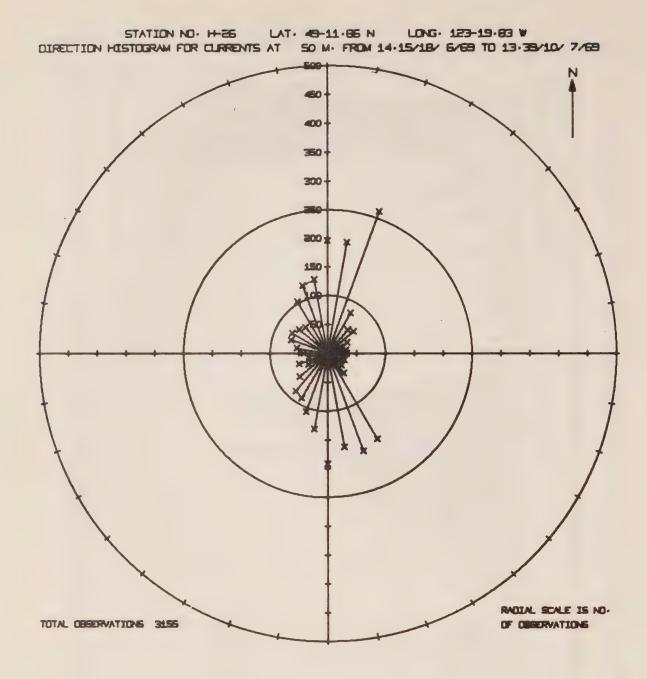


FIG. 9c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969.

STATION NO. H-26 LAT. 49-11.44 N LONG. 123-17.83 W
HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH UF 50 METERS
JCSERVATION PERIOD. FROM 14.15/13/ 6/64 10 13.39/10/ 7/69

MEAN TEMP. 7.00	FRIQU NO. O	ENCY PCT. C	Ĭ	6 1	106	150 I	1 500	250 I	1 300	0è6 1	400 I	450 I	500 1
7.75	Š	2											
7.10	ŏ	ś	i i										
7.15	٥	Ü	n										
7.20	2	U	0										
7.25 7.30	0	0	0										
7.35	0	0											
7.40	0	Ü	ń										
7.45	0	O.	Ú.										
7.50	)	- 3	0										
1.55	٥ ک	j S	r. J										
1.60	0	J											
1.70	ິ້າ	1											
7.75	О	(	C										
7.00	0	0	')										
7.35 1.90	3	3	2										
1.95	ī	j	)										
н.00	14	U	7										
d.05	10		rs e e										
8.10	34	1	7 * * * * * * *										
8.15 8.20	32 31	1	)*****										
8.25	58	2	0 * * * * * * * *										
8.30	14	2	.) ********										
0.35	64	3	0										
0.40	90	3	7		**								
8.45 8.50	74 57	2	0										
3.50	13	(	)***										
8.60	43	2	0										
8.65	35 .	1	)******										
8.70	50	2	100000000										
3.75 3.80	72 129	2	1)										
7.05	132	4	0 ******										
8.90	53	2											
4.75	72	2	0 *** * * * * * * *										
3.00	. 69	2	1000000000										
9.15 3.10	195	6											
2.10	261	3	()*******										
1070	93	3											
9.25	98	3	() * * * * * * * * * * * * * * * * * * *		****								
9.30 9.35	21 18	1	3										
9.40	42	i	0										
1.45	97	3											
1.50	135	4	(4444444										
9.55 2.60	13C 175	6	7 * * * * * * * * *				• •						
1.65	167	5	********										
9.70	200	5				*******							
4.75	91	3	) • • • • • • • •										
9.80 1.85	105 6	3	^*********										
1.90	10	0	)**										
7.75	0	0	C										
10.00	0	U	2										
10.05	0	0	)										
10.10	3	3	ý										
10.20	ő	Š	3										
1 '. 25	0	U	7										
10.30	1	0	0										
10.40	1 4	0	()										
10.40	ō	J	7										
150	0	Ü	0										
155	0	J	)										
10.50	0	.1	0										
10.70	1	Ü	0										
	b-												

FIG. 9D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS
OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH
JULY 10, 1969.

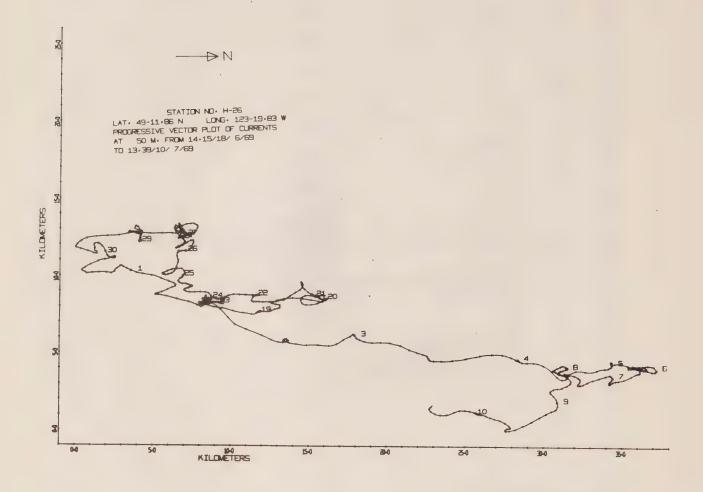


Fig. 9e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 22-day period during June 18 through July 10, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 15.39/10/ 7/69 TO 20.32/24/ 7/69

16 AN		UFNCY		100	150	200	250	300	350	400	450	500
SPEED		PC F.	I I	I	I	1	I	1	1	I	1	Ī
0	0	0	0									
10	111	5	0********	******								
20	74	4	0 * * * * * * * * * * * * * * * * * * *	***								
30	107	5	0 * * * * * * * * * * * * * *	******								
40	249	12	0			********	******					
50	144	7	O*****		****							
60	231	11	7*********		******	*******	***					
70	113	6	)*********									
3.0	157	8	()********		******							
70	100	5	.)*********	*******								
100	40	4	()*********									
110	140	7			***							
120	83	4	()********									
130	96	5	)*******	*****								
140	49	2	()*******									
150	77	4		* * *								
160	>1	-	0 * * * * *									
170	19	1	0****									
190	25	1	3****									
190	17	1	0+++									
200	26	i	3****									
210	11	1	0++									
220	23	1	0 * * * * *									
230	20	1	0****									
24U 250	12	Û	0**									
260	7	_	0+									
270		0	0**									
280	9	0	0									
280	1 2	-	0									
210	L	J	C.									
NUMBER	UF JPE	EDS GH	REATER THAN 2	?9) = J	NOW	BER OF OBS	ERVATIONS	= 2041	MEA	SPEED =	85 MM/SE	С

FIG. 10A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 14-DAY PERIOD DURING JULY 10 THROUGH JULY 24, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES OBSERVATION PERIOD, FROM 15.39/10/ 7/69 TU 20.32/24/ 7/69

MEAN DIR.		JENCY.		10 I	1.5	30 I	40 I	50 1	60	70 1	80	90 1	100
0	40	2	0 * * * * * * * *	******				•	•	•	•		·
5 10	27 30	1	0 * * * * * * *										
15	28	1	0 * * * * * * * *										
20	25	1	0 * * * * * * *										
?5 30	30 25	1	0 * * * * * * * *										
35	12	1	0 * * * * * * *			***							
40	12	1	0******										
45 50	18	1	0 * * * * * * * *		* * *								
55	14	ì	0 ******										
60	9 7	0	0 * * * * * * *	*									
65 ·	7	0	0 * * * * * *										
75	7	Ü	0 * * * * * *										
80 85	7	C 1	0										
70	7	ō	) * * * * * *										
35	3	0	0***										
106	8 8	0	(										
110	14	1	0	*****									
115	12	1	0 * * * * * * *										
120	10 19	0	0 ******										
130	9	ō	0 * * * * * * *										
135 140	14	1	()*******										
140	21	1	0										
150	31	2	0 * * * * * * * *										
155 160	35 47	2					· • • • • • • • • • • • • • • • • • • •	***					
165	63	3						*********					
170	60	3						*********					
175 180	70 86	3											
185	83	4											
190 195	65	3											
200	87 85	4											
205	65	3	0 * * * * * * *	******	******			*********					
210 235	44 27	2	0 * * * * * * * *					*					
240	36	2	-										
245	20	1	0										
250 255	27 24	1	0 * * * * * * * *										
26C	12	1	0*****	***									
265 270	10 14	0	0 * * * * * * * *										
275	9	ō	0 * * * * * * *										
280	15	1	0 * * * * * * * *										
285 290	8 21	0	0 * * * * * * * * * * * * * * * * * * *										
295	23	1	0 * * * * * * * *	*****		•							
300 305	10 15	0	0 * * * * * * * * * * * * * * * * * * *										
310	20	1	0******										
315	29	1	0 * * * * * * * *			*****							
320 325	19 25	1	0 * * * * * * * *										
330	33	2	•				•						
335	43	2											
340 345	45 50	2 2											
350	48	2	0 * * * * * * *	*****	******	******							
355	26	1	0******	******	******	***							

NUMBER OF OBSERVATIONS = 2041

A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS FIG. 10B. OBTAINED AT 10-MINUTE INTERVALS OVER 14-DAY PERIOD DURING JULY 10 THROUGH JULY 24, 1969.

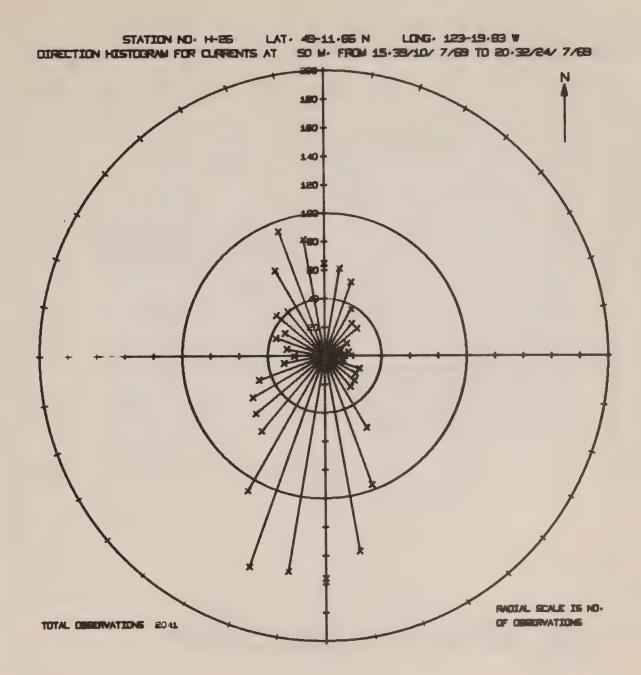


FIG. 10c. A HISTOGRAM OF DIRECTION (°TRUE), IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 14-DAY PERIOD DURING JULY 10 THROUGH JULY 24, 1969,

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS
DESERVATION PERIOD, FROM 15.39/10/ 7/69 TO 20.32/24/ 7/69

MEAN TEMP.	FREQUI	ENCY PCT.		100 150	0 200 I I	250 I	" 300 I	350 I	400 I	450 I	500
в.00	0	0	0								
8.05	0	G	0								
8.10	0	0	0								
d • 15	0	0	0								
8.20	0	0	0								
0.25 0.30	0	0	0								
d.35	0	0	0								
b.40	ó	Ü	0								
8.45	2	ō	0								
1.50	2	Ö	0								
d.55	0	0	0								
8.60	2	0	0								
8.65	* 3	0	0.								
8.70	5	. 0	0+								
8.75	2	0	9								
80.80	12	1	0**								
8.85	25 .	1	0****								
8.90	22	1	0 * * * *								
9.00	32 32	2	0 * * * * * *								
9.00	18	2	0****								
9.10	41	2	0******								
0.15	30	1	0*****								
9.20	40	2	0 *** * * * *								
9.25	59	3	0								
9.30	116	6	0	******							
9.35	121	6	0	******							
9.40	275	13	0	**********	*******	*******					
9.45	236	12	0	***********	***********						
9.50	209	10	0	**********	**********						
9.55	133	7	() + + + + + + + + + + + + + + + + + + +	*********							
9.60	235	12	0			•					
9.70	166 183	8 9	O*********		***						
9.75	39	2	0	***************************************							
9.80	1 .		0								
,,,,,			•								
NUMBER	OF TEMP	. GRI	ATER THAN 9.80	= 0	NUMBER OF OBSERVA	TIONS =	2041	MEAN	TEMP = 9.	44 DEG. C.	

FIG. 10D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 14-DAY PERIOD DURING JULY 10 THROUGH JULY 24, 1969.

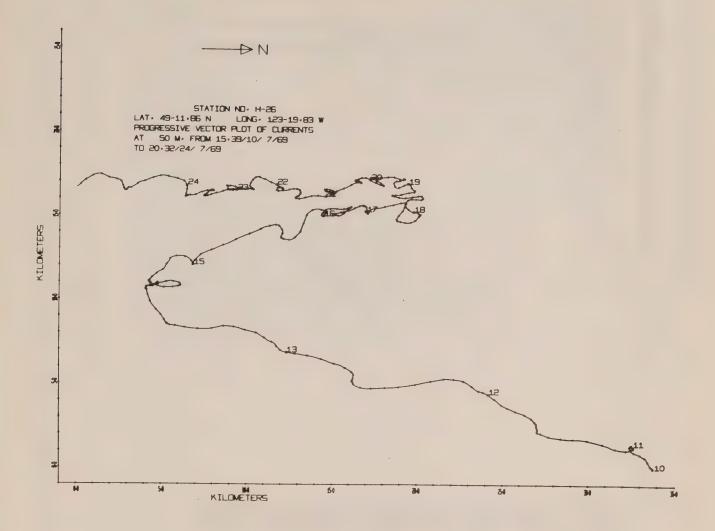


Fig. 10e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 14-day period during July 10 through July 24, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 12.27/28/ 8/69 TO 8.20/18/ 9/69

MEAN SPEED 0	FREQU NO. O		-	50 I	100	150 I	200 I	250 I	300 I	350 I	400 I	450 I	500 I
10	200	7	0										
20	116	4	0										
30	151	5	0 * * * * * * *	******									
40	313	10	0 ******										
50	229	8	0 ******	******				***					
60	349	12	0 *** * * * * *				********	*********		****			
70	194	6	0 ******										
80	243	8	0 ******	******			********	*****					
90	143	5	0	*****		****							
100	108	4	0******	*****	*****								
110	132	4	0******	******	• • • • • • • • • • •	• •							•
120	78	3		*****									
130	104	3	0	*****	*****								
140 150	73 92	2	0										
160	59	2	•		***								
170	49	2	0 ******										
180	85	3											
190	44	1	0 ******										
200	61	2	0*****	***									
210	21	1	0 * * * *										
220	45	2	0 * * * * * * *	4									
230	37	1	0 * * * * * *										
240	14	0	0 * * *										
250	22	1	0****										
260	7	0	0*										
270	11	0	0 * *										
280	9 7	0	0 * *										
290	/	0	0*										
NUMBER	OF SPEE	DS G	REATER THA	N 290	= )	NUME	BER OF OBS	ERVATIONS :	= 2996	MEAI	N SPEED =	88 MM/S	EC

FIG. 11A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM UF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRLS DESCRIVATION PERIOD, FROM 12.27/23/ 8/69 TO 8.20/18/ 9/69

MLAN	FREQUENC	CY	5 25 45	60	80 1	00 1	20	140	160	180	200
.913	NO. PC	Τ.		1	1	I	1	I	I	1	200
0		2		****				•	•	•	•
5	2.7	-	)********								
10	13		0								
15 20	32 32	_	0 * * * * * * * * * * * * * * * * * * *								
25	19	-	)*****								
30	21	_	0 *******								
35	20	1	D******								
40	21	1	()********								
45	27	1	()********								
50	32	-	O*********								
55	29		0								
60 65	30 28		()************************************								
70	27		.0**********								
75	32		0********								
80	24		0 * * * * * * * * * * * *								
8.5	19	1	0******								
90	21	1	()********								
95	20		()********								
100	21		2 * * * * * * * * * * * * * * * * * * *								
105 110	26		0								
110	949 58 2		O**************								
120	40		0*********	******							
125		2	]***************								
130	69		0 ***************		•						
135	86	3	?*******	******	******						
140	68		O*********								
145	92		.) *****************								
150	97					•					
155 160	132 . 4		O****************								
165	123 4		O***********								
170	120 . 4		0								
175	118 4		0 *** * * * * * * * * * * * * * * * * *								
180	128 4										
	120 -	÷	.)**************								
195	85 :	3	0 *************	*********							
170	85 ±	3	O**************	*********		******					
170 175	85 46 34	2	() * * * * * * * * * * * * * * * * * * *	*********		******					
190 195 200	85 46 34 1 35	3	0*************************************	*********		******					
170 175 200 275	85 3 46 2 34 1 35 1 39 1	3	() ************************************	*********		******					
190 195 200	85 46 34 1 35	3 1 1 1	0*************************************	*********							
170 175 200 275 210	35 1 35 1 37 1 37 1	3 1 1 1	()************************************	*********							
100 195 200 295 210 215 220 225	85 2 46 2 34 1 35 1 17 1 13 1 17 1 12 0		()************************************	*********		*******					
100 195 200 295 210 215 220 225 230	85 2 46 2 34 1 35 1 17 1 13 0 17 1 12 0 27 1			*********		*******					
100 195 200 205 210 215 220 225 230 235	85 46 2 34 1 35 1 39 1 7 1 1 3 1 7 1 1 2 2 7 1 2 2 1 1 2 2 2 1 1			*********							
170 175 200 275 210 215 220 225 230 235 240	95 46 2 34 1 35 1 7 1 1 3 1 7 1 1 2 2 7 1 2 2 0 1 1			*********							
100 195 200 205 210 215 220 225 230 235	95 46 2 34 1 35 39 17 11 3 17 12 27 12 20 17 11 17 11 17 12 17 12 17 17 17 17 17 17 17 17 17 17 17 17 17			*********							
170 175 200 275 210 215 220 225 230 235 240 245	95 46 2 34 1 35 39 17 11 3 6 17 12 27 12 20 11 7 11 17 11 17 12 17 22 11 17 11 17 11 17 11 17 11 17 11 17 11 17 11 17 11 17 17			*********							
190 195 200 205 210 215 220 225 230 235 240 245 255 260	95 46 2 34 135 17 17 12 27 12 27 12 27 10 10 15 14 16 17 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18			*********							
190 195 200 205 215 220 225 230 235 240 245 250 255 260 265	95 46 2 34 35 39 17 13 17 12 27 12 2 11 10 15 11 12 12 12 12 12 12 12 12 12 12 12 12		0*************************************	*********			••••				
190 195 200 215 210 225 220 225 235 240 245 250 255 260 265 270	95 46 2 34 35 39 17 13 17 12 27 12 20 11 17 10 15 11 14 12 18 11 18 11			*********			••••				
190 195 200 205 210 215 220 225 230 245 240 245 250 255 260 265 270	95 46 2 3 3 4 1 3 5 3 9 1 1 7 1 1 1 2 2 7 1 2 2 2 1 1 7 1 1 5 1 1 4 1 2 1 8 1 8 9 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6			*********			*****				
190 195 200 205 210 215 220 225 230 245 240 245 250 265 270 265 270 275 280	95 46 2 3 4 1 3 5 1 3 9 1 1 7 1 1 2 1 2 7 1 1 1 1 1 1 1 1 1 1 1			*********			*****				
190 195 200 205 210 215 220 225 230 245 240 245 250 255 260 265 270	95 46 2 3 3 4 1 3 5 3 9 1 1 7 1 1 1 2 2 7 1 2 2 2 1 1 7 1 1 5 1 1 4 1 2 1 8 1 8 9 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6			*********							
190 195 200 215 210 215 220 225 230 235 240 245 250 255 265 270 275 280 285	95 46 2 3 3 4 3 5 3 9 1 1 7 1 1 2 2 7 1 2 2 2 1 1 1 5 1 1 4 1 1 2 0 1 1 1 1 1 1 1 2 0 1 1 1 1 1 1 2 0 1 1 1 1		0	*********							
190 195 200 215 210 225 225 230 235 240 255 265 270 275 285 290 285 295 300	95 46 2 3 3 4 3 5 3 9 1 1 7 1 1 2 1 2 2 7 1 2 2 1 1 2 1 4 1 2 1 4 1 1 1 1 2 1 4 2 3 1 1 1 1 2 1 4 2 3 1 1 1 1 2 1 4 2 3 1 1 1 1 1 2 1 4 2 3 1 1 1 1 1 2 1 4 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			*********							
190 195 200 215 220 225 230 235 240 245 255 260 275 270 275 285 290 295 305	95 46 2 3 3 4 3 5 3 9 1 1 7 1 1 2 1 1 2 1 1 2 1 1 1 1 2 1 2 3 1 1 1 2 2 5 1 1 2 5 5 1 1 1 1 2 2 5 1 1 1 1			*********							
190 195 200 215 210 215 220 225 230 245 240 245 255 260 265 270 275 280 285 290 295 300 310	95 46 2 3 1 2 2 5 1 1 1 1 1 2 1 4 2 3 1 2 2 0 1 1 1 1 2 1 4 2 3 1 2 2 0 1 1 1 1 1 2 1 1 1 1 2 1 1 1 1 1			*********							
190 195 200 215 210 225 225 230 235 240 255 265 270 275 285 290 285 295 300 305 315	95 46 2 3 4 3 5 3 9 1 1 7 1 1 2 1 2 7 2 2 1 1 2 1 1 1 1 2 1 1 1 1										
190 195 200 215 220 225 235 240 245 255 260 265 270 275 285 290 295 305 310 315 320	95 46 2 3 3 3 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 4 3 1 1 1 4 3 1 1 1 4 3 1 1 1 4 3 1 1 1 1			••••			*****				
190 195 200 215 210 225 225 230 235 240 255 265 270 275 285 290 285 295 300 305 315	95 46 2 3 3 4 3 5 9 1 1 7 1 2 1 2 7 1 2 2 1 1 2 1 4 1 2 1 4 2 3 1 1 2 2 5 1 1 2 2 5 1 3 3 3 1 4 4 6 2 2 5 1 2 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			•••							
190 195 200 215 210 225 230 245 245 255 260 265 275 285 290 295 305 315 320 325	95 46 2 3 3 4 3 5 9 1 1 7 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 1 1 2 1 1 1 1 1 2 1 1 1 1 1 2 1 1 1 1 1 2 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1										
190 195 200 215 220 225 230 245 240 255 260 275 285 290 295 305 310 325 335 340	95 46 2 3 3 5 1 3 5 1 7 1 7 1 7 1 1 3 1 7 1 1 7 1 1 1 1 7 1 1 1 1										
190 195 200 215 220 225 230 235 240 255 265 270 285 295 300 315 325 330 335 345	95 46 2 3 3 4 3 5 1 1 2 1 2 1 1 1 1 2 1 1 4 1 2 3 1 1 2 2 1 1 2 2 3 1 1 2 2 5 1 2 2 5 1 2 2 5 1 2 3 3 3 4 3 6 4 5 5 6 4 6 4 2 2 5 6 4 2 2 5 6 4 2 2 5 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 5 6 6 4 2 2 6 6 6 4 2 2 6 6 6 6 6 6 6 6 6										
190 195 200 215 220 225 230 245 240 255 260 275 285 290 295 305 310 325 335 340	95 46 2 3 3 5 1 3 5 1 7 1 7 1 7 1 1 3 1 7 1 1 7 1 1 1 1 7 1 1 1 1										

NUMBER OF OBSERVATIONS = 2996

FIG. 11B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

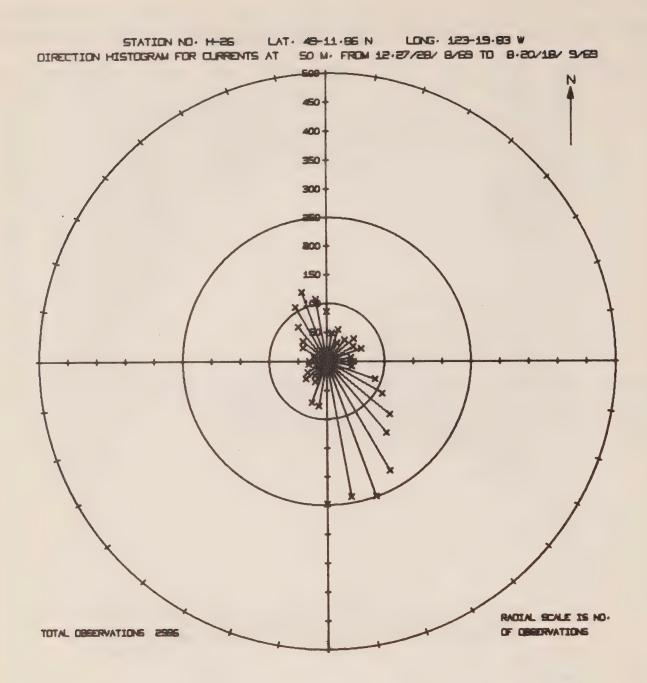


FIG. 11c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS OBSERVATION PERIOD, FROM 12.27/29/ 8/69 TU 8.23/18/ 9/69

MLAN	FREQU			50 10		150	200	250	300	350	400	450	500
TEMP.		PCT.		I	I	I	I	I	I	I	I	I	I
8.00	0		0										
ა.ე5 შ.10	ი ა	.)	0										
8.10	0	0	0										
8.20	0	0	0										
€.25	0		*0										
8.30	5	0	0										
ย.35	0	5	n n										
U.4U	0	Ö	ó										
0.45	Ö	0	Ů										
5.50	0	0	Ü										
3.55	Ó	0	0										
3.60	0	0	0										
8.65	0	0	2 .										
5.70	0	Ü	2										
8.75	0	0	0										
6.30	0	U	0										
8.85	0	Ú	2										
8.90	14	0	O+++										
8.95	82	3	3******	******									
9.00	2 ) 6	7	0******	********	*******	******	****						
9.05	167	6	)******	********	*******	*****							
9.10	368	12	******	******	******	*******	********			*****			
9.20	347 425	12	0 *******	******						***			
9.25	253	8	()******	*****									
9.30	261	9	0******										
9.35	215	7	0******	********	*******								
9.40	354	12	0******	*******	*******								
9.45	80	3	0******	******									
9.50	90	3	0******	********									
9.55	19	1	0****										
9.60	47	2	0 ******										
9.65	57	2	0 ******	***									
9.70	11	0	() * *										
NUMBER	OF TEMP	P. GR	EATER THAN	9.70 = 0		NUMBER (	F OPSERVA	TIONS = 2	996	MEAN TE	MP = 9.23	DEG. C.	

FIG. 11D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

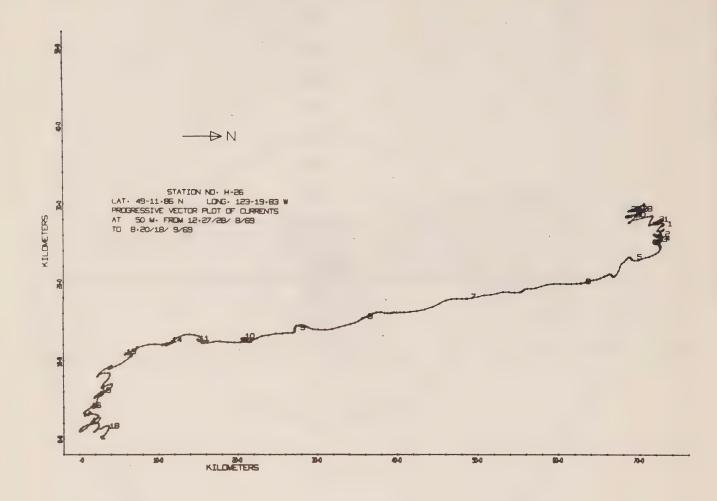


Fig. 11e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 21-day period during August 28 through September 18, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DESCRIVATION PERIOD, FROM 11. 5/18/ 9/69 FO 9.14/16/10/69

MEAN		UENCY	0	102	200	300	400	500	600
SPEED	NO.	PCT.	1	I	1	1	I	I	I
0	ن	- U	2						
10	279	7		*****		*****			
2.0	140	3	3*****	*****	*				
30	192	5	)*****	*****	* * * * * *				
40	485	12	.)******	*****	*******	******	*********	*****	
60	339	3	D*****	*****	* * * * * * * * *	******	• •		
b)	5.12	13	()******	*****	*****	******		*****	
7:3	310	8	0*****	*****	*******	******			
ี 90	321	8	0	*****	* * * * * * * * *	********			
100	204 181	5	)*****						
110	199	5	0 *****		*****				
120	30	2	1)*****		*****				
130	146	4	3*****						
140	96	2	0*****		•				1
150	<b>3</b> 3	2	0*****						
160	83	2	0******						
170	59	1	3*****						
130	75	2	0 * * * * * * *						
1.10	34	1	0***						
200	58	1	0*****						
21)	24	1	·)**						
220	43	i	) + + + + +						
230	2.0	1)	() * *						
240	14	5	Դ*						
250	16	Ü	() * *						
200	3	J	0						
270	5	3	)*						
240	1	C	)						
530	6	Ü	€.						
300	2	9	0						
31	1	ú	0						
320	1	3	o .						
330	?	0	1						
NUMBER	UF SPE	cos si	REATER TH	1AN 3.	3 <b>1</b> = 0	NU	MBER OF OBSI	ERVATIONS :	= 4015

MEAN SPEED = 81 MM/SEC

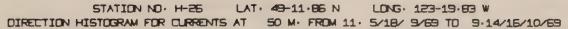
FIG. 12A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES JESERVATION PERIOD, FROM 11. 5/18/ 9/69 TO 9.14/16/13/69

			,						
MEAN	FREQUENCY	.0 50	100	150	200	250	300	350	400
DIR.	NO. PCT.		I	I	I	I	I	I	I
0	207 5	0 *********							
5	200 5	1) *** * * * * * * * * * *		********	*****				
10	167 4	]**********		********					
15	137 5	O********		***					
20	129 3	0 **********							
25	87 2	0 *** * * * * * * * * * * * * * * * * *							
30	93 2	0 *** * * * * * * * * * * * * * * * * *							
35	90 2	0 *********							
40	69 2	0 * * * * * * * * * * * * * * * * * * *							
45	71 2	0 * * * * * * * * * * * * * * * * * * *							
50	69 2	0							
55	61 2	0 *** * * * * * * * * * * * * * * * * *							
60	81 2	0							
. 65	65 2	0 *** * * * * * * * * * * * * * * * * *							
70	72 2	0**********							
75	47 1	0 * * * * * * * * *							
80	40 1	0*****							
95	41 1	0 ******							
90	43 1	0******							
95	32 1	0*****							
100	36 1	3*****							
105	29 1	0****							
110		C++++							
115	32 1 35 1	0+++++							
120		3*****							
125		0*****							
130	31 1 52 1								
		0							
135	36 1	0							
140	46 1	)******							
145	47 1	J#######							
150	50 1	0							
155	30 1	0							
160	28 1	()*****							
165	13 0	() * * *							
170	17 0	() * * *							
175	29 1	3*****							
180	36 1	0+++++							
185	21 1	() * * * *							
190	17 0	0 * * *							
195	14 0	0+++							
200	26 1	0 * * * * *							
205	20 0	0 * * * *							
210	18 0	0 * * * *							
215	16 0	0***							
220	15 U	0 * * *							
225	5 0	0*							
230	12 0	0 * *							
235	10 0	0 * *							
240	15 0	0 * * *				,			
245	11 0	0**							
250	18 0	0 * * * *							
255	16 0	0 * * *							
260	30 1	0 * * * * * *							
265	21 1	0 * * * *							
270	23 1	0 * * * * *							
275	32 1	0 * * * * *							
280	24 1	0 * * * * *							
285	24 1	0 * * * * *							
290	28 1	0 * * * * *							
295		0 * * * * *							
370	35 1	0 * * * * * *							
305	34 1	0 ******							
310	48 1	0 *** * * * * * * *							
315	73 2	0 **********							
320	80 2	0							
325	80 2	()**********							
330		0 *** * * * * * * * * * * * * * * * * *							
335		0 *** * * * * * * * * * * * * * * * * *							
340		0 *** * * * * * * * * * * * * * * * * *							
345		J*********							
350		0 **********			**				
355	153 4	0							

NUMBER OF OBSERVATIONS * 4015

FIG. 12B. A HISTOGRAM OF DIRECTION (*TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.



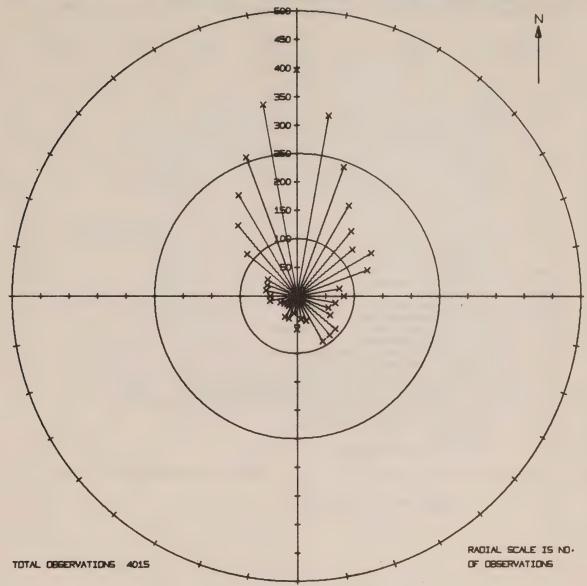


FIG. 12c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS DESTRUCTION PERIOD, FROM 11. 5/18/ 9/69 TO 9.14/16/13/69

MLAN	FREQU	ENCY	0	100	200	300	400	500	600
TIND .	NO.	PCT.	I	I	I	I	I	1 I	I
. 10	0	0	0						
٠ . ٦٥	0	C	0						
5.10	0	Ü	0					*	
.15	0	0	0						
5.20	O.	()	C						
.25	)	9	C						
7.30	Ü	9	1						
35	0	j	0						
.43	0	0	0						
45	0	0	0						
50	-)	()	0						
5.55	0	U	Ú						
3.60	1	5	Û						
7.655	1 2	0	0						
2.70	18		() * #						
3.80	52	)	0*****						
2.85	46	1							
3.90	144	4	0****	******					
8.95	90	2	()*****						
9.00	131	3		*****					
9.00	174	4	0*****		**				
9.10	287	7	()*****		*******	*****			
7.15	233	6	)*****		******				
7.20		9	0****		******	*********			
3.25	243	6	0*****		******	F W			
7.30	556	14	*****	******	******	********	******	*********	
9.35	411	10	0*****	******	******	********	*****		
1.41	517	13	0*****	*****	******	*********	******	******	
1.45	259	6	0*****	*******	*****				
1.50	256	6	)*****	******	******				
1.55	64	2	0 *****						
4.50	185	5	0****	******	****				
VIMBER	OF TEMP	• GR	EATER TH	1AN 9.60	= 0	NUMBE	R OF OBSE	ERVATIONS =	4015

MEAN TEMP = 9.27 DEG. C.

FIG. 12D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

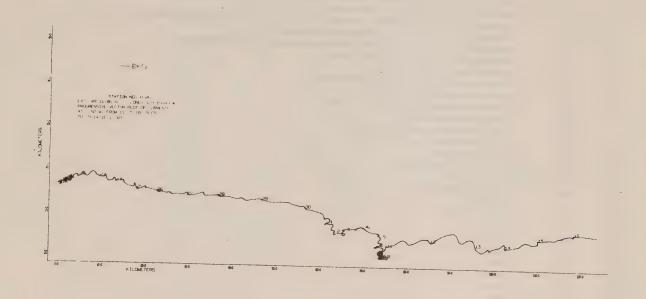


Fig. 12e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 28-day period during September 18 through October 16, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 14.17/16/10/69 TO 8. 9/25/11/69

MLAN	FREQ	UENCY	0	100	200	300	400	500	600	700
SPEED	NO.	PCT.	I	I	I	I	Ī	I	I	I
0	0	0	0							
10	324	6	() ** * * *	******	******	*******				
20	180	3		******	* * * * *					
30	231	4	0****	******	* * * * * * * * * *					
40	492	9	0****					****		
50	369	6	0****				* * * *			
69 70	644 327	11	0****							
80	466	6 8	0****							
90	254	4	0****			**				
100	207	4	3****	*******	******					
110	272	5	0****			****				
120	194	3		******						
130	261	5	0****			***				
40	158	3	0++++	******						
150	239	4	0 ****	******		*				
150	131	2	0****	******						
170	110	2	0****	*****						
180	145	3	0****	*****	# #					
120	87	1	0****	***						
200	124	2	0****	*****						
210	61	1	0****	+ 4						
220	79	1	)****							
.230	44	1	0****							
240	46	1	3****							
250	67	1	0****							
260	31	1	0***							
270	50	1	()****	•						
230	26	0	)*** ^**							
290 200	21	0	0**							
310	10	ű	0*							
320	17	0	O##							
330	9	i)	2#							
340	5	ŏ	0*							
350	4	Ö	Ü							
360	5	5	J#							
370	. 2	j	Ö							
NUMBER O	F SPE	EDS G	REAFER	THAN 3	70 = 0	NUM	BER OF OBSE	ERVATIONS	= 5694	

MEAN SPEED = 99 MM/SEC

FIG. 13A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOURAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METPES URSERVATION PERIOD, FROM 14-17/15/13/69 TO 8-9/25/11/69

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MEAN
 PREQUENCY ON NO. PCT. I
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 325
 330
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 335
 93
 340
 123
 345
 205
 355
 265
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NUMBER OF UBSERVATIONS = 5694

FIG. 13B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

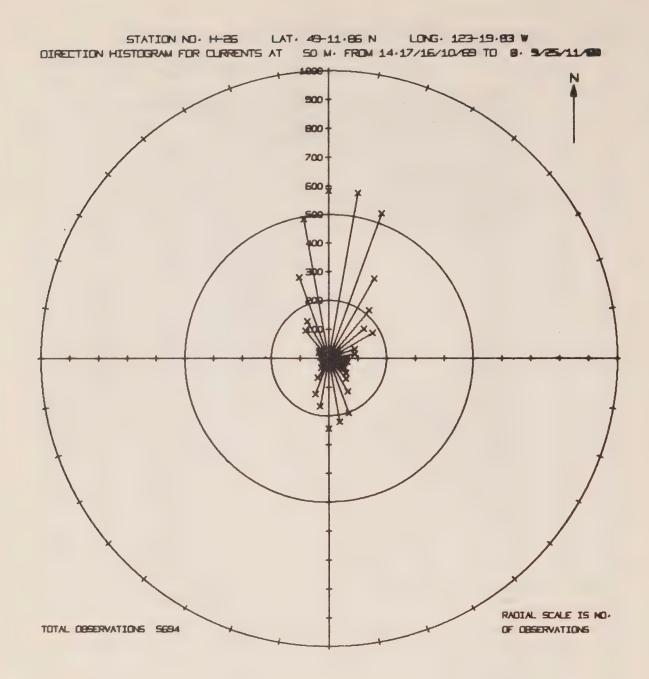


FIG. 13c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS DESERVATION PERIOD, FROM 14.17/16/10/09 TO 9. 9/25/11/69

MLAN	FREQU	JENCY	0 200	40.	600	900	1000	1200 -	1400	1600	1800	2000
TLMP.	NO.	PCT.	1 1	1	I	1	I	1 -	1	I	I	I
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3.05	0	0	2									
8.10	0	:)	)									
5.15	ດ	0	0									
8.20	9	i)	0									
0.25	C	Ů.	9									
5.30	J	u	0									
e . 35	0	C	0									
d • 40	0	U	a									
n • 45	0	0	2									
n.50	Ù	U	)									
8.55	0	0	3									
06.3	٥	O	0									
8.65	0	0	→									
8.70	0	ت	0									
8.75	. 0	0	0									
8.80	2	0	2									
85 ه ٿ	0	Ü	7									
8.90	10	Ú	9*									
8.95	396	7	)**********	******								
9.00	647	11	1)*********	*********	******							
9.05	507	9		*********	+ <del>4+</del>							
9.10	385	7	()**********	*****								
9.15	895	16	) * * * * * * * * * * * *	**********	*********		* *					
9.20	1658	29	.)*********	*******	********	*******	• • • • • • • • •	*********				
9.25	375	7		******								
9.30	456	9		******								
4.35	316	5	0	***								
9.40	49	1	0**									
NUMBER	OF TEMP	. GR	EATER THAN 9.	43 = J	MAMAR	ER OF DESE	RVATIONS =	5694	MEAN	TEMP = 9	.15 DEG. C	•

FIG. 13D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

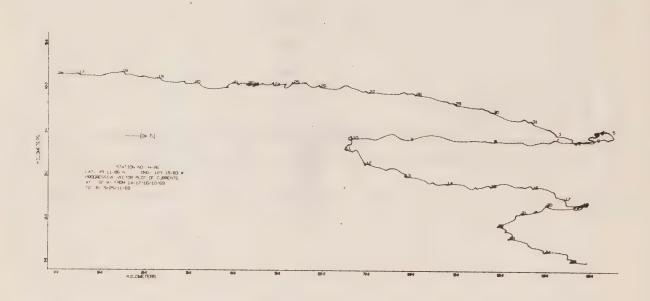


Fig. 13e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 40-day period during October 16 through November 25, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

- Fitton NO. H-26 L 7. 49-11.34 N . LONG. 123-19.83 N

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3.3	100		*****	***	****				
+ ,	4.4	C.	****	***	****	*****	*****		
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50	5.6	į	2020	***	*****		*******	******	
7.3	3 =					*******			
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110	336	,	****		****	******	•		
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250	140			***					
10	1	-		***					
. 30	2.4				*****				
. 13	126			*****					
(1)	100			****	****				
	125			*****					
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3.703	***								
283	43	1							
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350			*						
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4.31			e						
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	3		,						
420	.5								
430			7						
<b>→</b> 40	1		.1						

MEAN SPECD = 123 MM/SEC

FIG. 14A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 45-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 9, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

TISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES SERVATION PERIOD, FROM 10.20/25/11/69 TO 10. 5/ 9/ 1/70

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	NC.	PCT.		
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	213	4	***************************************	
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5	33 56	1	140000000	
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0	107	3		
5	255	3	)	
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5	39	1	)*******	
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5	3/3		)	
О	421	7	```	
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FIG. 14B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 45-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 9, 1970.

HIMBER UF URSERVATIONS = 6456

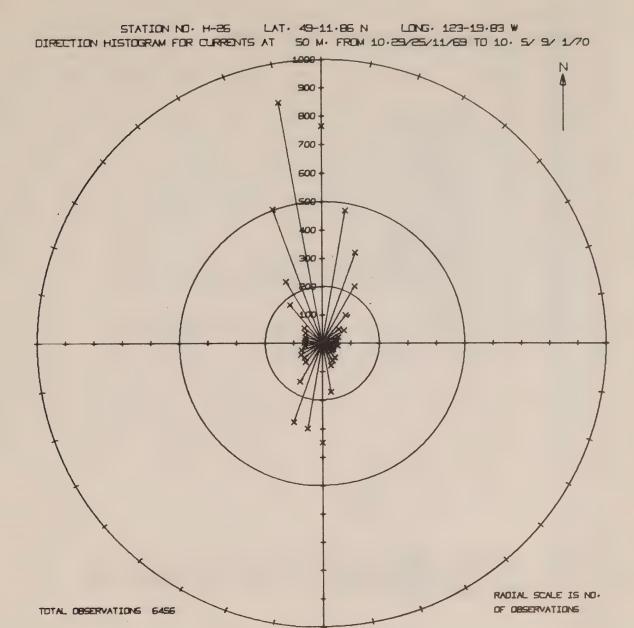


FIG. 14c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 45-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 9, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF: 50 METERS INSERVATION PERIOD, FROM 10.29/25/11/69 TO 10.5/ 9/ 1/70

.AN	FKEQ	UENCY	า	200	400	600	800	1000	1200	1400
I MP.	NO.	PCT.	I .	I	I	. I	1	I	I	I
3.00	0	C	J							
8.75	11	J	) #							
8.10	275	3	0.000							
0.15	207	44	) * * * *							
d.20	130	2	-0+++							
0.25	213	3	7 * * * 1							
3.30	232	4	7 * * * +	******						
1.35	234	4	A * * * !							
40	198	3	J***							
. 45	121	2	O * * * i							
1.50	159	2	0.000							
∃.55	64	1	()***							
1.60	225	3	11848							
5.65	227	4	(1000)							
o.70	215	4	) * * * ·	******						
3.75	23n	4		******						
3.80	237	4	)***							
3.85	301	5								
8.90	606	11			*****	*********	<b>)</b>			
8.95	1274	20			*****		*******		•••••	•
9.00	893	1.2	. 1 4 4 4 1	**********	*****		*****			
4.75	7.7	i	O###	•						
4.10	124	2	0***							
7.15	66	1	0***							

NUMBER OF TEMP. GREATER THAN 9.15 = J NUMBER OF OBSERVATIONS = 6456

MEAN TEMP = 8.71 DEG. C.

FIG. 14D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 45-DAY PERIOD DURING NOVEMBER 25, 1969 THROUGH JANUARY 9, 1970.



A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 45-day period during November 25, 1969 through January 9, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

Fig. 14e.

FISTOGRAM OF SPECD (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES SERVATION PERIOD, FROM 12.46/ 9/ 1/70 TO 2. 9/23/ 1/70

/ AN	FREQUENCY	0	50	100	150	200	250	300
1 PEED	NO. PCT.	Ī	I	I	I	I	. I	I
0	0 0	0						
10	95 5	0*****	******	****				
20	62 3	0*****	*****					
30	112 6	0 * * * * * *		******				
40	215 11	() * * * * * * *		********		*******		
50	163 8	0 * * * * * *		********	********			
60	179 9	0****			*********			
70	104 5	0****		******				
80	140 7	0****			****			
90	92 5	0 * * * * * * *		****				
100	60 3	0*****						
110	107 5	0*****		-				
120	68 3	0*****						
130	115 6 59 3	0*****		********				
140 150	59 3 61 3	0*****						
150	30 2	0*****						
.70	21 1	0****						
180	25 1	0****						
190	30 2	0 * * * * * *						
200	26 1	0****						
210	23 1	0****						
220	20 1	0++++						
230	13 1	0 * * *						
340	20 1	0 * * * *						
250	15 1	0 * * *						
260	11 1	0 * *						
770	10 1	0 * *						
290	5 0	0 =						
230	7 0	0 #						
300	7 0	0 *						
210	5 0	0 *						
20 د	15 1	0***						
330	7 0	0 *						
-40	14 1	0***						
.50	4 0	0#						
50 30	7 0	0#						
70	5 0	0*						
10	1 0	0						
· ER C	F SPEEDS G	REATER '	THAN 38	BO = 0	NUME	BER OF OBS	ERVATIONS	= 1953

MEAN SPEED = 98 MM/SEC

OBTAINED AT 10-MINUTE INTERVALS OVER 14-DAY PERIOD DURING JANUARY 9 THROUGH JANUARY 22, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (Deg. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES DESCRIVATION PERIOD, F. M. 12.46/ 9/ 1/10 TO 2. 3/23/ 1/70

A-AM PREQUENTY 0 20 49 60 80 100 120 140 160 101 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
0 63 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	MIDAN	FREQUENCY	0 20 40 60 80 100 120 140 160
10	DIR.	NO. PCT.	
10 89 6 5 0	0	63 3	() ************************************
15 76 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5	77 4	<u></u>
20	10	89 5	0***********************
25	15	76 4	0***************************
255 50 3 0	20	103 5	<u></u>
30 56 3 0		50 3	0
355 55 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
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So			
55 38 2 0			
60 35 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
65			
70			
75			
30			
95 12 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
90 10 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
95 11 1 0 0 1 1 1 0 0 1 1 1 0 1 1 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
100 11 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
105			
110			
115 12 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	125		
120	110	13 1	0******
125 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	115	12 1	0 + + + + + +
130	120	7 0	0****
135	125	6 0	0***
140	130	5 0	0***
1-5	135	7 0	0.000
150	140	12 1	0*****
155 23 1 0	145	13 1	()******
160       34       2       0 ************************************	150	23 1	0*********
165 29 1 0	155	23 1	0**********
170	160	34 2	9*********
11/5       35       2       0       180       37       2       0       185       83       4       0       185       83       4       0       185       83       4       0       185       83       4       0       185       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180       180	165	29 1	0********
180       37       2       0 ************************************	170	54 3	Эносновновновновновать с лини
180       37       2       0 ************************************	175	35 2	0**********
185       83       4       0 ************************************	180		0***********
190  96  5  0			0
195			0
200 67 3 0			0
205 51 3 0 0 ********************************			
210			
215			
220			0
225			0*******
230			
235			Osese###
240			0.00
245			
250 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			0.0000000000000000000000000000000000000
255 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			0****
260 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
265 11 1 0****** 270 5 0 0*** 275 15 1 0****** 280 9 0 0**** 285 11 1 0***** 290 9 0 0**** 300 7 0 0**** 300 8 0 0**** 310 8 0 0**** 315 7 0 0**** 320 11 1 0***** 325 7 0 0**** 330 9 0 0**** 331 9 0 0**** 335 15 1 0****** 340 14 1 0****** 345 13 1 0*******			7***
270			
275			0***
280 9 0 0 0***** 285 11 1 0****** 290 9 0 0***** 300 7 0 0**** 305 8 0 0**** 315 7 0 0**** 320 11 1 0***** 325 7 0 0**** 335 9 0 0**** 336 15 1 0****** 340 14 1 0****** 340 16 1 0******			0******
285 11 1 0 ****** 290 9 0 0 ***** 300 7 0 0 ***** 300 8 0 0 **** 310 8 0 0 **** 315 7 0 0 **** 320 11 1 0 ***** 325 7 0 0 **** 336 9 0 0 **** 337 9 0 0 **** 338 9 15 1 0 ****** 340 14 1 0 ****** 345 13 1 0 *******			
290 9 0 0 0			0*****
295 12 1 0****** 300 7 0 0**** 305 8 0 0**** 310 8 0 0**** 315 7 0 0**** 320 11 1 0***** 325 7 0 0**** 3330 9 0 0**** 335 15 1 0****** 340 14 1 0****** 345 13 1 0******			
300 7 0 0**** 305 8 0 0**** 310 8 0 0**** 315 7 0 0**** 320 11 1 0***** 325 7 0 0**** 330 9 0 0**** 331 15 1 0****** 340 14 1 0****** 345 13 1 0******			0*****
305 8 0 0 •••• 310 8 0 0 •••• 315 7 0 0 •••• 320 11 1 0 ••••• 325 7 0 0 •••• 3330 9 0 0 •••• 335 15 1 0 •••••• 340 14 1 0 •••••• 345 13 1 0 ••••••			0.444
310 8 0 0**** 315 7 0 0**** 320 11 1 0***** 325 7 0 0**** 330 9 0 0**** 335 15 1 0****** 340 14 1 0****** 345 13 1 0******			
315			·
320 11 1 0 ****** 325 7 0 0 ****  330 9 0 0 ****  335 15 1 0 *****  340 14 1 0 ******  345 13 1 0 ******  350 16 1 0 ******			
325 7 0 0 •• • • • 330 9 0 0 •• • • • • • • • • • • • • • • •			
330 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
335			0****
340 14 1 0******* 345 13 1 0******* 350 16 1 0*******			
345 13 1 0******* 350 16 1 0*******			0*****
350 16 1 0******			

NUMBER OF OBSERVATIONS = 1953

FIG. 15B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 14-DAY PERIOD DURING JANUARY 9 THROUGH JANUARY 22, 1970.

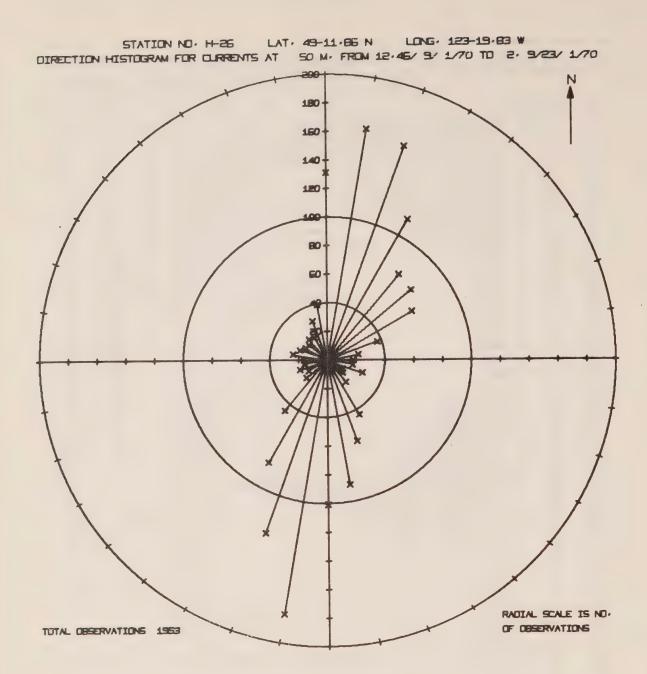


FIG. 15c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 14-DAY PERIOD DURING JANUARY 9 THROUGH JANUARY 22, 1970.

DISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS DISERVATION PERIOD, FROM 12.46/ 9/ 1/70 TO 2. 9/23/ 1/70

M_AN	FREQUEN							300	350	400	450	500
TOMP.	NO. PC	Τ.	I	1 1	1	I I	I	1	1	I	I	1
7.00			0									
7.05			0									
1.10		_	0									
7.15			0								,	
7.20			0								`	
7.25			0									
7.30		0	0									
7.35		0	0									
7.40		0	0									
7.45	0		0									
7.50	0	0	0									
7.55	0	0,	0									
7.60 7.65	0	0.	0									
7.70	71	4	0									
7.75		. <del>T</del>	0									
7.80		3	0	• •								
7.85	100	5	0	*********	,							
1.90		20	0				********		* * * * * * * * * * *			
7.95		16	0				********		4			
5.00		ii	0 *** * * * * * *	********	*******	********	****					
. 05	104	5	0 *******	********	• w							
1.10	94	5	0	********								
3.15	109	6	0 *** * * * * * *	********								
0.20	16	1	0 * * *									
8.25	38	2	0 * * * * * * * *									
3.30	7	0	0.									
<b>მ</b> ₀35	13	1	0 * * *									
: 40	3	0	0*									
3.45	5	0	0*									
4.50	12	1	0**									
ა.55	30	2	0*****									
B • 60	16	1	0 * * *									
თ <b>.65</b>	9	0	0 * *									
IUMBER	OF TEMP.	GRE	TATER THAN	8.65 = 0		NUMBER OF C	ESERVATIONS	S = 1953	ME	AN TEMP =	7.95 DEG.	С.

FIG. 15D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 14-DAY PERIOD DURING JANUARY 9 THROUGH JANUARY 22, 1970.

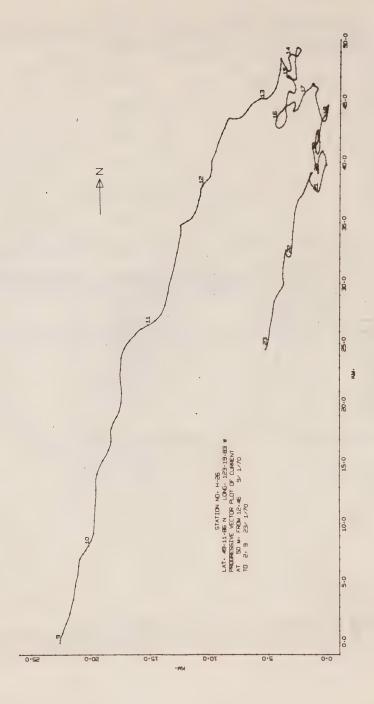


Fig. 15e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 14-day period during January 9 through January 22, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

STATETY VO. H-26 LAT. 49-11.80 V LONG. 123-19.83 W

415TUDRAM OF SPEED (MM/520) FOR CORRENTS AT A DEPTH OF 50 METRES 1 DERVATION PERIOD, FROM 15.45/1197 E/70 TO 10.18/25/ M/70

MEAN		UENCY		5.)	17	150	200	250	300	350	400	450	500
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20	127	3											
30	158	2											
۲. ۱	306	3	3*****		*****		*******						
50	234	0		*****	* * * * * * * * * *	* * * * * * * * * *							
.5 /	415	1 1	D*****		* * * * * * * * * *		*******	• • • • • • • • • •	******		********	*******	****
7.3	344	1	-	******		* * * * * * * * * *	• • • • • • • • •		*******	*****			
40	132	· ·		*****		• • • • • • • • • • •	*******	********	********	• • • • • • • • • • •	***		
30	243	9		*****			*******						
100	209	4			******	*******							
110	313 135	4			*********								
120	259	4											
140	1+7	3											
150	202	4		*****									
150	125	3											
173	1 34	3											
1.50	159	3		******									
7 1 7	05	:	~*****	*****									
7.10	٥l	ď.		******	* *								
210	45	1	^*****										
550	49	1	)*****	***									
230	24		)****										
240	2.7	_	)****										
230	23	1	)*****										
260 273	7	j j											
210	4	3											
. 10	5	-											
500	4	j											
اد ا	4	ì											
	UF SPE	EDS JA	REATER T	HAN 51	U = .	EMUN	ER OF OBS	ERVATIONS =	4865	MEAN	SPEED =	94 MM/SE	С

FIG. 16A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES DESERVATION PERIOD, FROM 15.43/19/ 2/70 TO 10.18/25/ 3/70

				4.50		0.5.0	200	250	
MEAN CER.	FREQUENCY		105	150	200 I	250 I	300 I	350 I	400 I
0	NU. PCT. 267 5					******			1
5	244 5	0 *** * * * * * * * * * * * * * * * * *	*********						
10	245 5	0 *********	*********						
15	240 5		**********	*********	*******	****			
20	258 5	0 **********		********	*******	*******			
2.5	108 2	.) * * * * * * * * * * * * * *	********						
30	60 1 48 1	7*******							
35 40	48 1 38 i	0							
45	40 1	]******							
50	37 1	)******							
55	43 1	0 ******							
. 60	48 1	)*******							
65	33 I 32 I	()******							
70 75	32 1 24 0	0****							
80	25 1	0****							
85	21 0	3****							
90	16 0	0***							
95	25 1	)****							
100	24 )	0****							
105 110	23 Ù 28 1	0*****							
115	35 1	0*****							
120	29 1	0 * * * * *							
125	25 1	()****							
130	32 1	0 * * * * *							
135 .	27 1	0 * * * * *							
140	37 1	)******							
145 150	30 1 42 1	0*****							
155	42 1	0 * * * * * * * *							
160	31 1	0 * * * * *							
165	25 1	0****							
170	41 1	0******							
175	47 1	0 * * * * * * * * *							
180 185	58 1 77 2	0							
190	74 2	0+********							
195	60 1	0*******							
200	36 1	0 *****							
205	37 1	0*****							
210	30 1	0*****							
21 <b>5</b> 220	27 1	0****							
225	17 0	0***							
230	20 0	0***							
235	8 0	0 * *							
240	16 0	0+++							
245	19 0	0****							
250 255	26 1 14 0	()***							
260	17 0	0***							
265	24 0	0****							
270	25 1	0****							
275	28 1	0*****							
28 <b>0</b> 28 <b>5</b>	34 1 33 1	0*****							
290	28 1	0*****							
295	37 1	0*****							
300	31 1	0*****							
305	45 1.								
310	56 1	0 * * * * * * * * * * * * * * * * * * *							
315 320	50 1 63 · 1	0 * * * * * * * * * * * * * * * * * * *							
325	93 2	0*********							
330	143 3	0*********	********						
335	174 4	0*********		*******					
340		0********							
345		0 * * * * * * * * * * * * * * * * * * *							
350 355	274 6 265 5	()**********					•		
222	200	U							
141 144 D T 13	05 00000047	2404 = 2401							

NUMBER OF OBSERVATIONS = 4865

FIG. 16B. A HISTOGRAM OF DIRECTION (*TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970.

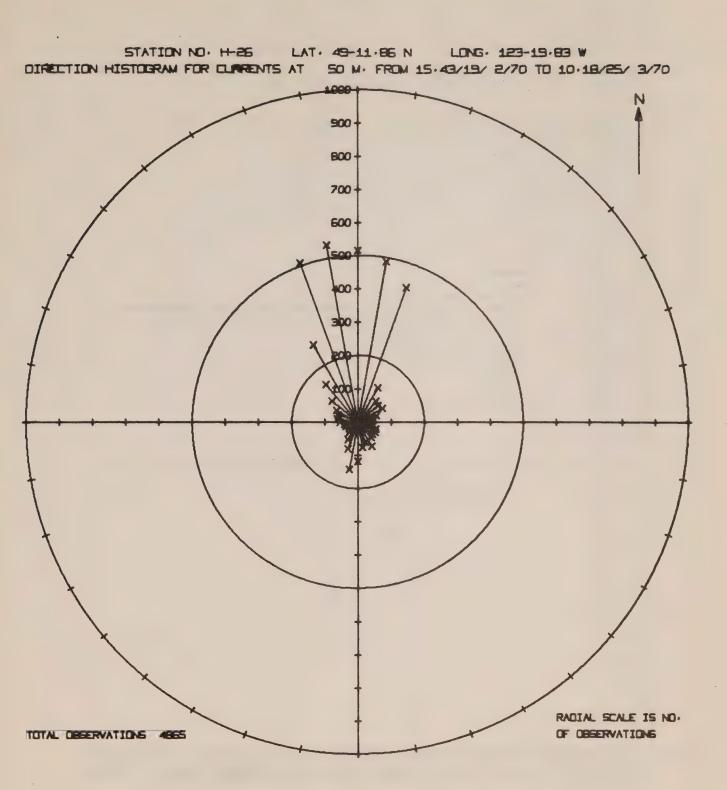


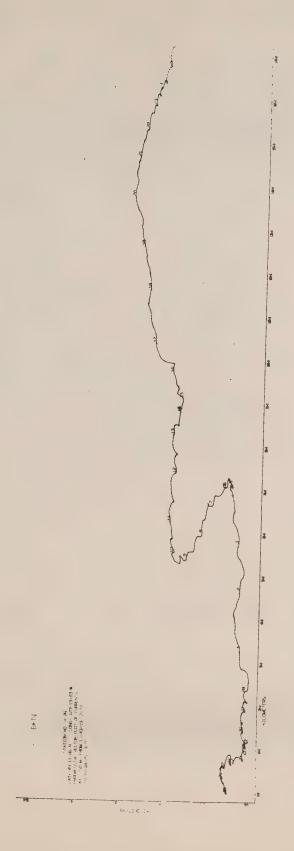
FIG. 16c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970.

HE TOSRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS PECKVATION PERIOD, FROM 15.43/19/ 2/70 TO 10.18/25/ 3/70

CAN .	FRED	ULNCY	0 200	400	: 600	800 - 100	1200	1400
EMP.	NO.	PCT.	I	1	I	I	I	
1. 3	3	9	.)					
1.75	()		9					
7.10	0	9						
7.15	0	)						
1.00	*	·.)	C					
1.00	)	J	F. Communication of the Commun					
• ' >								
7.35	7		^					
1:								
15	0	3						
7.50	S		)					
7.55	100	_	()****					
1.50	42	1	(***					
1.65	354	7	)*****	****				
7.70	1185	24	*********	*******	*******			
7.75	1,53	22	*********	*****			****	
7)	213	11		*******				
1.05	503	19	0	******	•			
7.90	337	7		***				
7.95	153	4 3	*******					
4.70	133 166	3	O*****					
3.75	178	<i>3</i>	)******					
2.10	59		0***					
2.15	35	1	7**					
	20	4	, H H					
.20	6							

MEAN TEMP = 7.80 DEG. C.

FIG. 16D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970.



February 19 through March 25, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 34-day period during same as at this location.

Fig. 16e.

MISTOGRAM OF SPECD (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES SERVATION PERIOD, FROM 13. 8/25/ 3/70 TO 15. 0/27/ 4/70

MTAN SPEED	FREQUE NU. F	CT.	I	100	200 I	300 I	400 I	500 I	600 1	700 1	800 I	1	1000 I
J	Ç	0	0										
10	352			********		********	**						
20	183	4											
30	252	5		********									
40	463	10		********				••••					
50	372	8		********		********							
60	662	14								• • •			
70	420	9		********									
80	415	9											
90	212 164	4											
110	262	5											
120	161	3											
130	164	4		*******									
140	93	2		*****									
150	121	3											
150	63 ,		0***										
175	57	1	0 * * *										
180	45	1	0 * * *										
190	39	1	0 * * *	• •									
200	43	1	0 ***										
210	24	1	0 **										
220	36	1	() * * 1										
230	11	0	0 *										
240	13	0	O#										
250	15	0	0**										
260	16	0	0**										
270	19	0	0++										
230	13	J	0#										
290	15	0	0 * *										
300	8	0	0 *										
310 320	10	0	0 #										
330	3	)	0										
340	Ö	ó	0										
350	0	0	0										
360	ò	0	0										
370	O	0	0										
380	0	)	0										
390	0	0	0										
400	0	0	0										
410	0	0	Ď										
420	0	0	0										
430	0	0	0										
440	0	0	0										
450	0	0	0										
460	0	0	0										
470 480	0	0	0										
490	0	0	0										
500	0	3	0										
510	0	0	0										
520	0	0	0										
530	0	o o	0										
540	0	0	0										
550	1	C	0										
	UF SPEE			ER THAN 5	50 = 0	NUM	BER OF OBS	SERVATIONS :	= 4765	ME	AN SPEED =	80 MM/S	EC

FIG. 17A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING MARCH 25 THROUGH APRIL 27, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTIO: (DEG. TRUE) FOR CURRENTS AT A DEPTH OF - 50 METRES DESERVATION PERIOD, FROM 13. 8/25/ 3/70 TO 15. 3/27/ 4/70

MEAN	FREJUE	N/C V	) 20 40 60 80 100 120 140 160 180 20	00
JIR.		CT.		00
U	171	4	)	•
5	133	4	<b>Оприменения объектический в поменения в оприменения объектический в менения в менения</b>	
10	157	3	^======================================	
15	178	4	j	
20	109	4	^*************************************	
15 3.	151 158	3		
35	85	2	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
40	71	1	)	
45	67	1	0	
50	64	1		
55	56	1	)***********************	
50	3.4	1	^*************************************	
65 <b>7</b> 0	23 36	1		
75	28 28	i i	) = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =	
30	41	1	100000000000000000000	
35	32	1	) = = = = = = = = = = = = = = = = = = =	
30	37	1	388688688868888	
35	26	1	<b>1)8000000000000000000000000000000000000</b>	
100	<b>36</b>	1	35.0000000000000000	
135	30 42	1		
11-) 115	42	1	7.8×************************************	
120	47	ì	15000000000000000000	
125	31	ī		
130	37	1	)	
135	28	1	1000000000000	
140	3.7	1	^ey•••*••••aes	
145	47	1		
150 155	23	1	720000000000000000000000000000000000000	
163	54 72	2	()=====================================	
165	15	2	<u> </u>	
170	97	2	)	
175	135	2	100000000000000000000000000000000000000	
130	75	2	<u> </u>	
185	90	2	1	
190 195	33	,		
500	93	2	``````````````````````````````````````	
2)5	74	2	<u> </u>	
210	61	1	***************************************	
215	63	1	100000000000000000000000000000000000000	
220	5,1	1	144444444444444444444444444444444444444	
225	75	5		
230 235	51 38	1	)	
240	38 31	1	)**************************************	
245	25	1	/	
250	22	Ū	Oneses need a second and a second a second and a second a	
255	20	Ö	<b>∩ониновоение</b>	
260	23	0	0.0000000000000000000000000000000000000	
265 270	26	1		
275	27 32	1		
240	25	ŝ	Connection	
285	19	ñ	) 	
290	26	1	0.000.000.000.000	
295	27	1	9********	
370	31	1	10.6.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0	
3:15	53	1	^*****************************	
310 315	62 45	1	) ************************************	
320	57	1		
325	65		7,0000000000000000000000000000000000000	
330	83	2	),,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
335	114	2	<u> </u>	
340	101	2	ý*************************************	
345	135	3	^*************************************	
350 355	165	3		
373	145	3		

IUMBER UF USSERVATIONS = 4765

FIG. 17B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING MARCH 25 THROUGH APRIL 27, 1970.

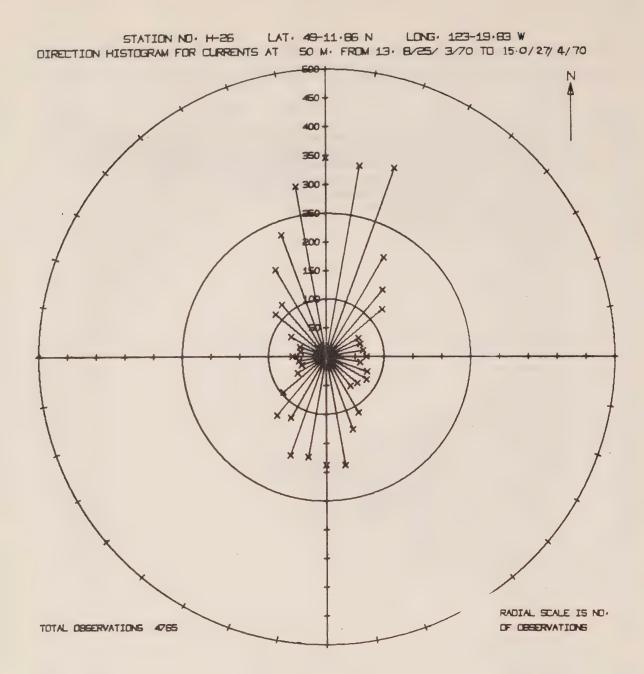


FIG. 17c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING MARCH 25 THROUGH APRIL 27, 1970.

\$14FE04 NO. H-26 LAT. 49-11.86 N LONG. 123-19.83 W

MISTORAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS ) SERVATION PERIOD, FROM 13. 8/25/ 3/70 TO 15. J/27/ 4/70

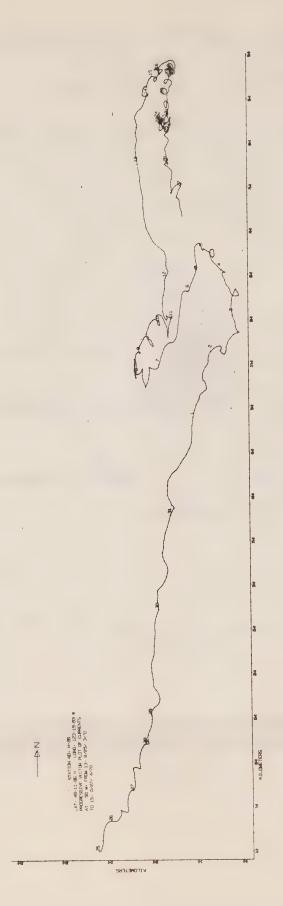
MIAN	FREV	UENCY		っしょ	1000	1500	2000	2500	3000
TOMP.	.GV	PCI.	I	I	I	I	I	. I	I
7.00	0	- 1	^						
1.00	0	5	7						
7.10	^	C	**						
7.15	0	Ū	()						
7.20	r.	- 0	es es						
7.25	0	Ű	0						
7.20	(,	Ų.	0						
7.35	. 0	0	Ü						
7.40	. 0	- C	)						
7.45	0	)	Ç						
7.50	1) ·	5	)						
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7.60	· r _j	9	0						
7.55	. 0	O	0						
7.70	i i	ij	0						
7.75	0	0	Ü						
7.80	0	ō.	0						
7.35	0	ij	0						
7.90	)	0	0						
7.95	11	3	0						
8.00	1403	29	0 * * * *	******	********	****			
Ø • 05 1.0	2773	58	()****	*****	******	*****	*******	*****	*
5.10	478	10	()*	*****					
8.15	57	. 1	C #						
8.20	42	_	0						
8.25	1 .	U	U						

MEAN TEMP = 8.04 DEG. C.

NUMBER OF OBSERVATIONS = 4765

NUMBER OF TEMP. GREATER THAN 8.25 = 0

FIG. 17D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING MARCH 25 THROUGH APRIL 27, 1970.



components of current velocity from records obtained at 10-minute intervals over 33-day period during March 25 through April 27, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same A progressive vector diagram constructed from successive cumulative values of north-south and east-west as at this location. Fig. 17e.

HISTOGRAM OF SPECE (MM/SEC) FOR CURRESTS AT A DIPTH OF THE MITRIES OF SERVATION PIPE, FROM 8.21/19/4/7 TO 11.11/.7/ 77

FREQ.			200	00E 1	400 I	500 I	100	700 I	008	900 I	1000
0	0	0					_		•	•	
1	Ç										
179											
463	6	()**********			********						
378	5										
				******	*********	* * * * * * * * * * *		• • • • • • • • •	*****		
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FIG. 18A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 52-DAY PERIOD DURING APRIL 28 THROUGH JUNE 19, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

GISTOURAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES DESCRIVATION PERIOD, FROM 8.21/28/ 4/70 TO 11.11/19/ 6/70

MCAN	EREO	UENCY	0	50	100	150	200	250	300	350	400
JIR.	NU.	PCT.	I	I	I	I	I	I	I	ī	I
C	147	2								· ·	•
5	134	2	0 * * * * * *	*****		****					
10	153	2	0 *****	*****	******	*********					
15	196	3	<b>*****</b>	******	******						
20	252	و	<b>*****</b>	*****			*****				
2 5	109	3	()*****								
30	114	2	0******								
3.5	72	1		*****	* * * *						
40	35	1	)*****								
45	83	1	0 *****	****	* * *						
50	74	1	0 *****	*****							
55	68	1	0 *****	*****							
50	56	1	0 * * * * * *	* * * *							
. 65	49	1	)*****	***							
70	49	1	7*****								
75	46	1	.)******	***							
80	44	1	()*****								
35	59	1	)*****								
90	÷7	1	O*****								
95	4 8	1	^*****								
100	53	1	i) * * * * * * *								
175	43	1	0 *****	* *							
110	29	0	0****								
115	52	1	0 * * * * * *								
120	33	3	O*****								
125	45	1	0 *****								
130	67	1	0*****								
135	50	1	0 * * * * * *								
140	58	1	0 * * * * * *								
145	109	1	0 * * * * * *								
150	127	2			*******						
155	158	2				*******					
160	181	2				******					
165	224	3				********					
170	249	3				• • • • • • • • • •					
175	241	3						****			
180 185	282	4							**		
190	222 251	. 3									
195		3						******			
200	213 205	3									
205	181	2									
210	178	2									
215	159	2					• • •				
220	126	2			******						
225	136	2			*******						
230	117	2									
235	116	2	0 *****	******							
240	101	1	0	*****							
245	103	1	0*****	*****	*****						
250	61	1	0 * * * * * * *	****							
255	66	1	()******	****							
260	54	1	0*****								
265	67	1	0*****								
270	53	1	)*****								
275	45	1	0*****								
280	43	1	D * * * * * * *								
235	38	1	0 * * * * * *	*							
290	25	0	0 * * * * *								
295	31	0	0*****								
300	40	1	3*****								
305	49	1	0 ******								
310 315	62	1	0 ******								
320	52 79	1	0 *****								
325	61	1	0 ******								
330	89	1	0								
335	72	1	0								
340	100	1	0 * * * * * *								
345	95	î	0 * * * * * *								
350	102	î	0*****								
355	116	2									

NUMBER OF OBSERVATIONS = 7496

FIG. 18B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 52-DAY PERIOD DURING APRIL 28 THROUGH JUNE 19, 1970.

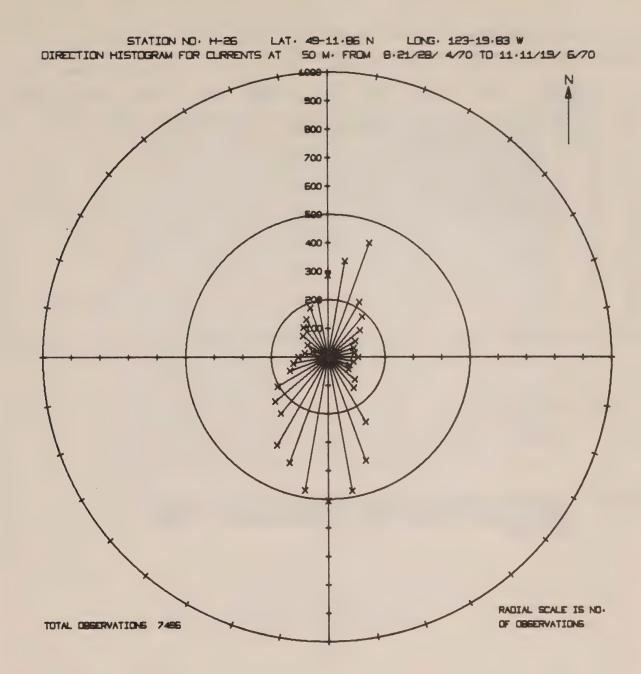


FIG. 18c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 52-DAY PERIOD DURING APRIL 28 THROUGH JUNE 19, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 50 METERS OBSERVATION PERIOD, FROM 8.21/28/ 4/70 TO 11.11/19/ 6/70

MEAN	FREQU	ENCY	0	200	400	600	800	1000	1200	1400	1600	1800	200
TEMP.	NO.	PCT.	1	I	I	I	I	I	1	1	ĭ	1	
8.00	0	0	)										
8.05	1769	24	0 ** * *	*********		**********	******	*******	• • • • • • • • • • •	• • • • • • • • • •	• • • • • • • • • •	****	
0.10	755	10	0	********		*********	* * *						
8.15	478	. 6	0 * * * *	*********		•							
8.20	524	7	0***			***							
8.25	582	d	0****			*****							
n.30	715	10	0	********		**********	•						
8.35	634	8	0	******									
8.40	483	6	0			•							
8.45	434	6	0										
8.50	374	5	¥	· • • • • • • • • • • • • • • • • • • •									
b.55	281 149	2	0 * * * *										
8.60 8.65	67	2	0+++										
8.70	68	1	0===										
8.75	68	1	0 * * *										
8.80	42	1	0++										
8.85	28	ō	0.*										
8.90	27	Ü	0.0										
8.95	6	0	0										
9.00	5	0	0										
9.05	6	0	0										
9.10	1	Ü	0										
NUMBER	OF TEMP	. GR	EATER	THAN 9.10	) = 0	NUMBER	OF OBSE	RVATIONS :	= 7496	MEAN	TEMP = R	.26 DEG. C	

FIG. 18p. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 52-DAY PERIOD DURING APRIL 28 THROUGH JUNE 19, 1970.



Fig. 18e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 52-day period during April 28 through June 19, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH .F 50 METRES OBSERVATION PERIOD, FROM 13.56/19/ 6/70 FO 11. 8/28/ 7/70

MIAN SPEED		UENCY PCT.		100	500	300	400	500	600	700	800	900	10
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20	ĭ	~											
, ,	ō	υ	7										
40	7	0	0.										
50	21	0	0++										
60	151	3	0 * * * *	*******									
70	138	2	3***										
80	352	6	0 * * * *		• • • • • • • • •	••••	**						
20	313	6	0****			*****							
100	405	7	0 ** * *	*******	********		*****	,					
110	655	12	0+++	*******		• • • • • • • • • •	********	********	*********	***			
120	412	7		********		********	******						
¥30	631	11	0****	*******		********		• • • • • • • • • •	********				
140	369	7	0 * * * *	*******	********	********	****						
150	483	9	0****	*******	********	********	********	****					
160	256	5	3****	*******	* * * * * * * * * *	***							
170	208	4		******									
190	306	5	0 * * * *	******		*******							
190	152	3		*******									
200	234	4			• • • • • • • • • •								
210	119	2	-	******									
220	152 80	3	0****	*****	• •								
240	54	1	0 * * * *										
250	46	1	0										
260	12	Ô	0+	•									
270	15	ő	Ü * *										
280	4	0	0										
290	12	ن	0.										
300	4	ن	0										
310	2	o	Š										
320	4	Û	Ď										
330	1	0	0										
MUNDER	OF SPE	EDS 3	REATER	THAN 3	30 = 0	NUM	BER OF OBS	ERVATIONS	= 5599	MEA	N SPEED =	137 MM/S	EC

FIG. 19A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 39-DAY PERIOD DURING JUNE 19 THROUGH JULY 28, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 100 METRES DESTRUATION PERIOD, FROM 13.56/107 677 TO 11. 5/237 7/70

	3000NU - POT	
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10 15	7 3	
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20 17	7 2	
5 17		
3.3 1.2		
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55 6		9************************
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70 4 75 3		(******************
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10 4		***************************************
15 3		)****************
20 5		
25 . 6	7 1	)
30 4	5 1	
35 5	0 1	/*******************
40 5	5 1	****************************
45 3		
-3 11	7 :	***************************************
55 15	2 3	116.64666666666666666666666666666666666
دا (د		?**************************************
65 17		***************************************
7 / 15	5 3	
75 14		
50 12	J 3	
30 12 35 10	3 2 8 2	
50 12 35 13 30 10	3 2 8 2 1 2	
30 12 35 13 30 10 95 8	3 2 8 2 1 2 2 1	
30 12 35 13 30 10 75 8	3 2 1 2 2 1 3 1	
35 13 35 13 30 10 35 8 35 8 75 7	3 2 1 2 2 1 3 1 7 1	
30 12 35 13 30 10 30 10 75 8 70 7 5 5	3 2 1 2 2 1 3 1 7 1 6 1	
30 12 35 13 30 10 30 10 75 8 70 7 75 5 10 4	0 2 2 1 1 2 2 1 1 3 1 1 7 1 1 6 1 0 1 1	
30 12 35 13 90 10 95 8 90 7 75 5 10 4 15 4	3 2 1 2 2 1 1 3 1 7 1 6 1 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
35 13 35 13 30 10 35 8 30 7 35 5 10 4 15 4 20 3 25 2	3 2 1 2 2 1 1 3 1 7 1 6 1 1 3 1 1 9 1 1	
35 13 35 13 30 10 35 8 30 7 35 5 10 4 15 4 20 3 25 2	0 2 2 1 2 2 1 3 1 7 1 6 1 1 3 1 1 9 1 4 0 0	
30 12 35 13 35 13 30 10 55 8 50 57 55 55 10 4 15 4 20 3 30 2 335 1	0 2 2 1 2 2 1 3 1 7 1 6 1 1 3 1 1 9 1 4 0 0	
30 12 35 13 35 13 30 10 55 8 50 57 55 55 10 4 15 4 20 3 30 2 335 1	0 2 2 1 1 2 2 3 1 1 7 6 0 1 1 3 3 4 5 5 3	
35 13 35 13 35 13 35 13 35 13 35 15 36 20 37 20 37 20 37 37 20 37 37 20 38	0 2 2 1 1 2 2 3 1 1 7 6 0 1 1 3 3 4 5 5 3	
35 13 35 13 35 13 35 13 35 13 35 13 36 23 37 22 38	J 22 11 22 11 17 16 11 10 11 11 11 11 11 11 11 11 11 11 11	
30 12 13 13 13 13 13 13 13 13 13 13 13 13 13	0 28 22 112 117 117 117 117 117 117 117 117	
30 12 35 13 35 13 35 13 35 13 35 15 36 22 37 22 37 22 37 22 37 22 37 22 37 22 37 37 22 37 37 37 37 37 37 37 37 37 37 37 37 37 3	3 22 21 12 3 1 1 1 7 7 6 6 1 1 3 3 1 1 1 2 3 4 9 6 6 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	
35 13 35 13 35 13 36 13 37 13 37 5 5 5 5 10 4 41 5 20 3 33 2 23 3 33 5 10 2 24 5 25 2 26 3 37 5 27 5 28 2 29 3 30 2 30 3 30 2 30 2	3 22 1123 1 177 1 177 1 1 1 1 1 1 1 1 1 1 1 1 1	
30 12 35 10 35 10 35 75 30 20 31 20 32 20 33 35 11 34 35 22 36 36 36 20 37 37 37 37 37 37 37 37 37 37 37 37 37 3	0 25 22 11 22 11 17 11 16 16 16 16 16 16 16 16 16 16 16 16	
30 12 35 13 30 10 30 10 30 10 30 10 40 22 30 22 30 22 30 22 30 35 11 40 22 40 22	3 22 1 2 2 2 3 1 7 6 6 1 1 3 3 4 4 5 5 3 4 4 7 9 1 1 2 2 6 6 7 7 9	
35 10 35 10 35 10 35 5 30 2 31 2 32 2 33 2 33 2 33 3 33 2 34 45 2 36 6 37 6 38 6	0 28 22 1 1 2 2 1 1 7 6 1 1 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
30 12 35 10 36 10 37 5 30 2 31 10 31 5 32 2 33 5 34 0 32 2 33 5 34 0 36 2 37 5 38 6 39 6 30 1 30	3 22 1 1 2 2 3 1 1 7 6 6 1 1 1 3 3 4 4 7 7 8 1 1 5 5 6 7 9 1 1 5 5 6 7 9 1 1 5 5 6 7 9 1 5 5 6 7 9 1 5 5 6 7 9 1 5 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5 6 7 9 1 5	
30 12 13 13 13 13 13 13 13 13 13 13 13 13 13	3 22 1 2 2 3 7 1 1 7 6 6 0 3 3 4 4 5 5 3 4 4 9 0 0 0 2 2 6 7 7 9 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	
30 12 35 10 35 10 35 10 35 10 36 20 37 5 55 36 20 37 5 20 37 5 20 38 5 20	0 22 21 22 21 17 76 0 1 1 2 2 2 3 3 4 4 5 5 3 4 4 5 5 5 5 4 5 5 5 5 4	
30 12 13 13 13 13 13 13 13 13 13 13 13 13 13	3	
30 12 13 13 13 13 13 13 13 13 13 13 13 13 13	3	
30 12 35 10 35 10 35 10 35 10 36 20 37 5 5 5 37 5 5 5 38 5 2 2 38 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	3	
30 12 13 13 13 13 13 13 13 13 13 13 13 13 13	3	
30 12 13 13 13 13 13 13 13 13 13 13 13 13 13	3 5 5 5 5 6 6 7 1 1 1 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	
30 12 35 13 36 13 37 10 37 5 5 5 10 4 15 22 5 2 2 3 35 1 1 2 2 2 3 36 6 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	3 22 2 1 1 2 2 3 7 6 6 7 1 1 2 2 3 3 4 4 5 5 5 4 4 6 6 7 1 1 4 4 3 3 2 2 3 3 4 4 5 3 3 4 5 5 5 4 6 6 7 1 1 4 4 3 3 2 2 3 3 4 5 5 5 4 6 6 7 1 1 4 4 3 3 2 2 3 3 3 4 5 5 5 6 6 6 7 1 1 4 4 3 3 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
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30 12 13 13 13 13 13 13 13 13 13 13 13 13 13	3 5 5 2 1 1 1 2 3 7 6 0 3 3 4 4 9 5 5 5 4 6 7 7 1 4 4 3 3 4 9 5 5 5 5 6 6 7 7 1 4 4 3 3 4 9 5 5 5 6 6 7 1 4 4 3 3 4 9 5 5 5 6 6 7 1 4 4 3 3 4 9 5 5 5 6 6 7 1 4 4 3 3 4 9 5 5 5 6 6 7 1 4 4 3 3 4 9 5 5 5 6 6 7 1 4 4 3 3 4 9 5 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 9 5 6 6 7 1 4 4 3 3 4 4 9 5 6 6 7 1 4 4 3 3 4 4 9 5 6 6 7 1 4 4 3 4 4 5 6 6 7 1 4 4 3 4 4 5 6 6 7 1 4 4 3 4	7

NUMBER OF OBSERVATIONS = 1599

FIG. 19B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 39-DAY PERIOD DURING JUNE 19 THROUGH JULY 28, 1970.

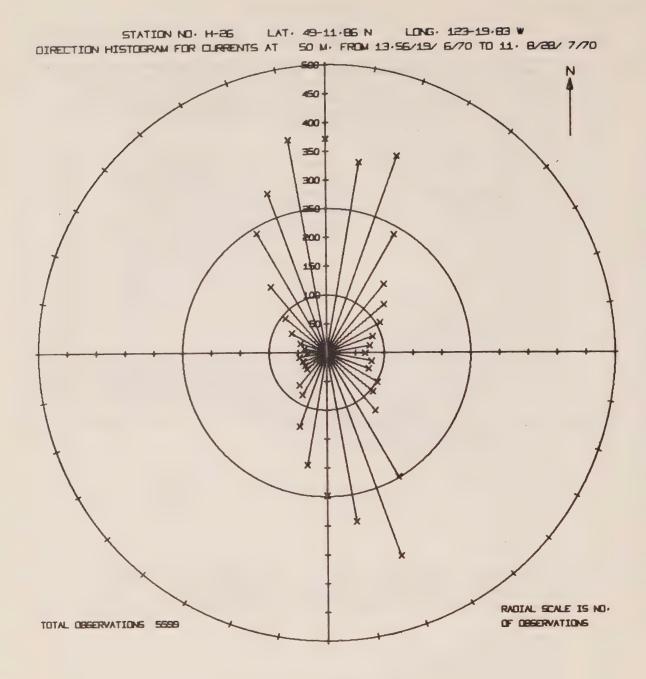


FIG. 19c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 39-DAY PERIOD DURING JUNE 19 THROUGH JULY 28, 1970.

STATION NO. H-26 LAT. 49-11.85 N. LUNG. 123-19.83 M.
MISTUGRAM OF TEMPERATURE (DEG. CONT.) AT A DEPTH OF 50 METERS
DESERVATION PERIOD, FROM 13.56/19/ 6//0 TO 11. d/28/ 7/70

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4: 1V
F: MP.
3: 10
3:05
 700
 300
 1600
 Ú
NUMBER OF TEMP. GREATER THAN 12.95 = 15
 NUMBER OF OBSERVATIONS = 5599
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FIG. 19D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 39-DAY PERIOD DURING JUNE 19 THROUGH JULY 28, 1970.

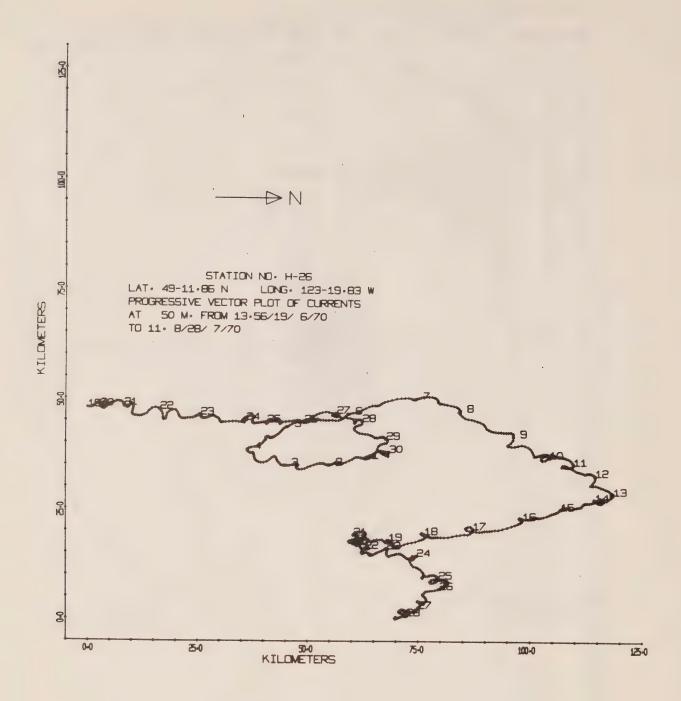


Fig. 19e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 39-day period during June 19 through July 28, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CORPENTS AT A DEPTH OF 140 METRES DESCRIVATION PERIOD, FROM 11.23/16/ 4/59 () 11.23/15/ 5/69

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120	144	ź										
110	187	4		*********	********	****						
140	105	3	A	******								
150	143	3		*******	****							
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173	102	į		*******								
1.30	121	3	)*********	********	*							
190	6.7	ì										
200	5.3	2		****								
.10	55	1	********									
220	46	1	~*****									
230	35	1	0 ******									
241)	25	ì	9****									
250	35	1	1444444									
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42)	j	ñ										
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440	(،		A.									
450	1	j	-ô									
				45) = :	NUM	BER OF DBS	ERVATIONS	= 4177	MEAI	N SPEED =	94 MM/S	EC

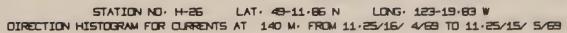
FIG. 20A. A HISTOGRAM OF SPEED (NM/SEC), WITH CLASS INTERVAL OF 10 NM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 140 METRES DESCRIVATION PERIOD, FROM 11.25/16/ 4/69 TO 11.25/15/ 5/69

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45	70 2	)*********							
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55	42 1	0							
60	43 1	1) *******							
. 65	47 1	() * * * * * * * * *							
70	42 1	0 * * * * * * *							
15	31 1	0*****							
<b></b> 60	27 1	0 * * * * *							
95	39 1	0 * * * * * * * *							
3.)	32 1	0							
95	22 1	0 * * * *							
100	21 1	0 * * * *							
105 110	20 0	0***							
115	17 0	.***							
120	17 0	7***							
125	30 1	0 * * * * *							
130	36 1	700000							
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145	38 1	0 * * * * * * *							
150	33 1	)******							
155	33 1	0******							
160	30 1	0 * * * * *							
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220	21 1	0****							
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235	17 0	)***							
243	17 0	0 * * *							
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255	16 0 26 1	0****							
260	22 1	0****							
265	32 1	0*****							
270	21 1	0****							
275	15 0	0***							
280	26 1	0 * * * * *							
285	20 0	7****							
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235		) = 0 4 4							
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340		0 **********	***						
345	97 2	0 * * * * * * * * * * * * *	*****						
350		)********							
355	204 5	0 * * * * * * * * * * * * * * * * * * *	********	*******	******				

NUMBER OF UBSERVATIONS = 4177

FIG. 20B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969.



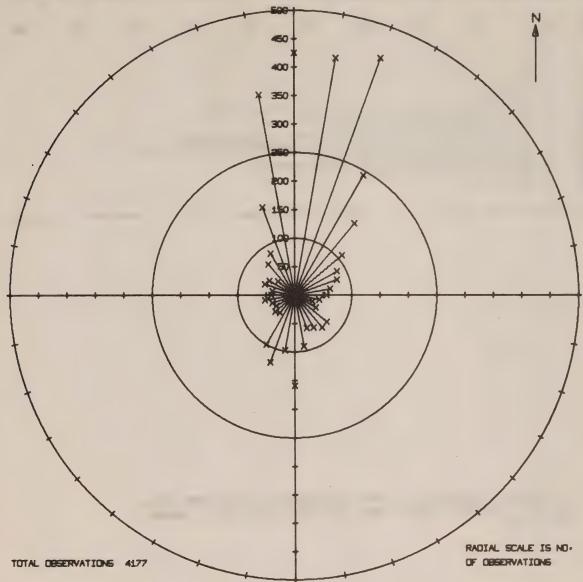
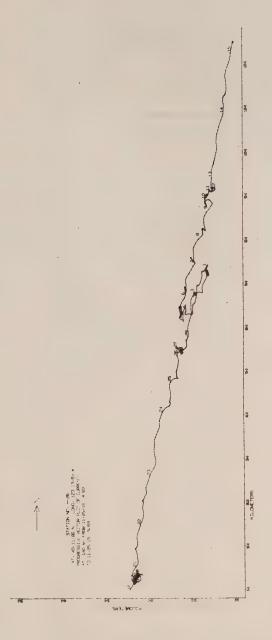


FIG. 20c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969.

HISTOGRAM OF FEMPERATURE (DEG. CENT.) AT A DEPTH OF 140 METERS OBSERVATION PERIOD. FROM 11.25/16/ 4/69 TO 11.25/15/ 5/69

MEAN	FREQU	N: NC V	3	100	29J	. 300	400	500	600	708	800	900	1000
TEMP.		PCT.		1	- 1	3	1	1	1	1	1	1	1
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1.05	2	2	0										
7.10	0	. 3	)										
7.15	H	3	30										
1.?0	15	- 3	3.										
1.25	81	2	30000	••••									
1.10	119	3	20000	•••••									
1.35	571	14	00000	••••••	••••••	•••••	•••••	•••••					
7.40	399	10	20000	••••••	•••••	••••••	******						
1.45	366	3	Ü++++	••••••	*********	•••••	••••						
7.50	621	15	30000	•••••	*******	• • • • • • • • •	• • • • • • • • • • • • • •	•••••	••••••				
1.55	- 665	15	J.				••••••		*********	••••			
1.50	392	9	30000	•••••	••••••	•••••	•••••			•			
1.65	504	12	20000	•••••			••••••						
7.75	298	- '			••••••		41.5						
7.75	-114	-	_	•••••									
7.90	6	0	Ú.										
NUMBER	OF TEMP	. GR	EATER	FHAN 7.50	* 5	NUMB	ER OF DBSERVA	FIONS .	4177 %	. MEAN	TERP . 7.	SI DEG. C.	

FIG. 20b. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 29-DAY PERIOD DURING APRIL 16 THROUGH MAY 15, 1969.



A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 29-day period during April 16 through May 15, 1969. The spatial scale corresponds to the displacement of the water that would occur if the entire neighboring area of the location of the instrument was the same as at this location.

Fig. 20e.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 140 METRES UPSERVATION PERIOD, FROM 13.25/15/ 5/69 TO 22.15/15/ 6/69

NO.	PCT.		1	I	I	1	1	1	1	
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132	2									
63	- 1									
	2	0**********	***							
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36	1	0*****								
77	2	J**********	* * 1							
20	1	0****								
47	1	0 * * * * * * * * *								
23	1	()****								
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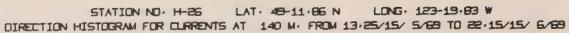
FIG. 21A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 31-DAY PERIOD DURING MAY 15 THROUGH JUNE 15, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTO-RAM OF DIRECTION (UEG. TRUE) FOR CURRENTS AT A DEPTH OF -140 METRES DISERVATION PERIOD, FROM 13.25/15/ 5/69 TO 22.15/15/ 6/69

Mu: A N	FREQUENC	OY 0 50 100 150 200 250 300 - 3	150 40	00
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15 15	265 6			
15	21) 5			
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21,	102			
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· 65	41 1 32 1			
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110	10 1			
115	16 )			
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125	25			
130	16 0			
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145 .5J	21 3 3 1			
155	36 1			
151	44 1			
165	53 1			
17)	67 1			
175	64 1			
190	77 2			
170	98 5	2 )		
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355	265 ć	5 3		
LIMBEL	OF UBSCOVA	ATIONS + A519		

NUMBER OF UBSERVATIONS = 4518

FIG. 21B. A HISTOGRAM OF DIRECTION ("TRUE), WITH CLASS INTERVAL OF 5", FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 31-DAY PERIOD DURING MAY 15 THROUGH JUNE 15, 1969.



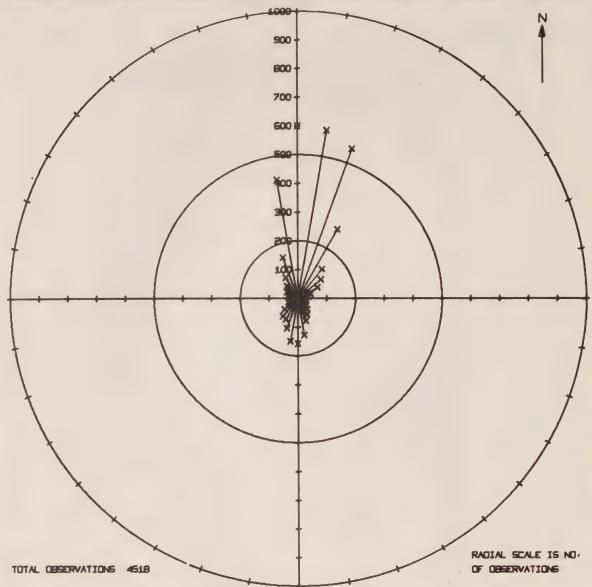
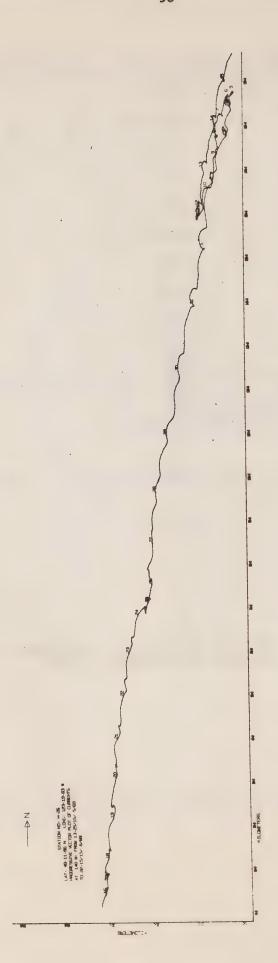


FIG. 21c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 31-DAY PERIOD DURING MAY 15 THROUGH JUNE 15, 1969.

HISTOURAM OF TEMPERATURE (DEG. JEHF.) AT A DEPTH OF 140 METERS J. SERVATION PERIOD, FROM 13.25/15/ 5/69 TO 22.15/15/ 6/69

MEAN	FREQUE			105	235	300	400	500	600	700	800	900	1000
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7.13	1)		.)										
7.15	O	5	)										
7.20	2	j	)										
7.25	ó	5	j										
7.33	0		a .										
7.35	0												
7.40	3		÷,										
1.45	8	J	) *										
7.50	16	)	.) * *										
7.55	17	1.0	J										
7.50	23	1	3**										
7.65	80	2	7****										
7.73	219	5	0 * * * *		*******								
7.75 7.80	118	3		*******									
7.95		. 2	74+++										
7.90	93	.2											
7.95	94	2											
2.70	113	3		******									
6.75	147	3	)***										
6.10	262	6		*******									
0.15	349	3	() * * * *	*******	*****								
b.20	145	3	)***	******	•								
0.25	409	9	3****	••••••	*********	*****	******						
d.30	253	U			**********								
. 35	392	3	()***	*******		*****							
0.40	441	13											
0.45	493 514	11	3****										
r.55	85	2		****									
80	25	1	0***										
3.55	11	3	0.4										
0.77													
JUMBER	UF TEMP.	. G-2 [	BATER	THAN 3.6"	<b>≠</b> ′`	NUM'	BER OF OBSER	VATIONS =	4518	MEAN	TEMP = 8	21 DEG. C	•

FIG. 21D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 31-DAY PERIOD DURING MAY 15 THROUGH JUNE 15, 1969.



May 15 through June 15, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 31-day period during as at this location. Fig. 21e.

FI FI N NO. H-26 LAT. 49-11.35 N LONG. 123-19.83 W

DIDTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 140 METRES DERIVATION PERIOD, FROM 14.13/12/ 6/69 FG 13.31/10/ 7/69

1 A 1 3P 2 ( D	NO.	BINCY PCT.		) · · · · · · · · · · · · · · · · · · ·	1000	7 150 I	. 21		250 I	300 I	350
13	2 <i>52</i>	: ਲ	_; 								
1 ·	115	7				******	*****				
4)	187	. 6									
+ \ 1	325	15	)******						*******	*******	
50	1 03	5	()*******		******						
5 <b>0</b>	235	9		******	******	******	*****		*******		
75	154	5	)******	******	******	*****	* *				
50	230	7			******	*****	*****	******			
30	151	j j		*****	*****	*****	*				
7 3.3	133	l _t	0 * * * * * * * * *		******						
110	158	5	)******		******	*****	*				
120	113	4	)******		******						
130	130	5	1)*******			*****	****				
140	118	4	******								
130	115	4	********		******						
160	69	2	0******								
170	53	2	)******								
130	13	2	3******								
190	36	-1	()******								
200	36 15	1	0*****								
210 220	32	1	)****								
230	14	0	)***								
240	21	1	)****								
250	21	1	)****								
260	3	ű	0#								
270	13	ő	0***								
280	15	õ	0***								
290	9		J**								
300	4	C	0*								
510	5	0	0*								
320	7	0	0*								
330	4	0	() *								
340	2	0	0	,							
350	0	_									
360	3		0#								
373	3	0	0*								
330	2	Ü	0								
NUMBER	OF SPE	EDS G	REATER THAN	N 300	= 0 .	N	UMBER D	F OBSERVAT	rions = :	3163	

MEAN SPEED = 90 MM/SEC

FIG. 22A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 140 METRES JOSERVATION PERIOD, FROM 14.13/18/ 5/69 TO 13.31/10/ 7/69

```
FREQUENCY ON NO. PCT. I
MIAN
 50
 10)
 250
 300
 350
 400
 NO.
234
DIR.
 96
 30
 19
 35
 0 *****
 45
 31
 5J
55
 0-----
 0****
 23
 0***
 6)
 16
 21
 0 ***
 0.4
 75
 0++
 5 O
 0***
 13
 6
 15
 90
 () * * *
 95
 0...
 001
 () # #
 105
 () * * *
 110
 0 * * *
 115
120
 0 * *
 Ü
 0##
 10
 0 ***
 130
 135
 0***
 16
 0===
 145
 0 ***
 150
155
 160
 165
170
175
 40
50
 0-----
 180
 190
 195
 53
 0 ********
 200
205
210
 56
 61
 Ü******
 48
 223
 0
 11
 **C
 230
235
 0 * * *
 3***
 13
 O.
 0**
 240
 245
 0++
 250
 255
 0 ***
 260
 14
 0 * * *
 265
270
 35
 (....
 20
 0 ****
 275
 20
 0 ***
 280
 0 ** * *
 285
 0 * * *
 290
 10
 9##
 245
 0##
 11
 500
 305
 19
 310
 315
 31
 325
 30
 330
 70
 335
 68
 340
 345
 92
 350
 119
 355
 140
 G****************
```

NUMBER OF OBSERVATIONS = 3163

FIG. 22B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969.

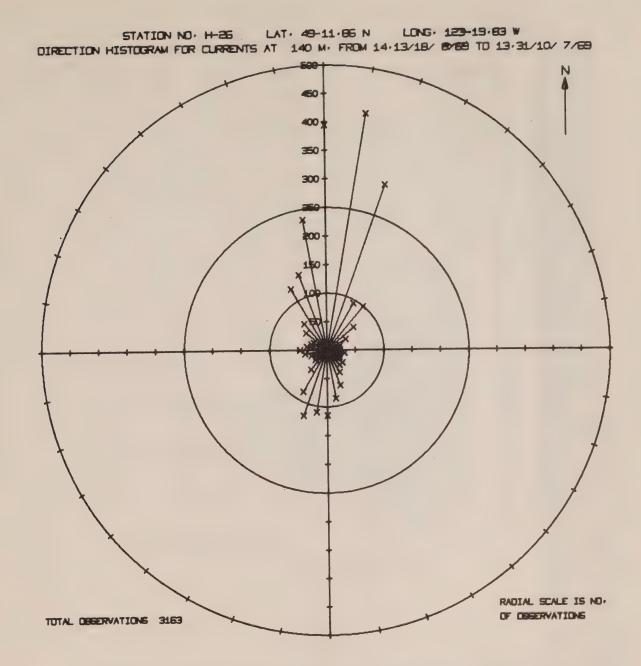


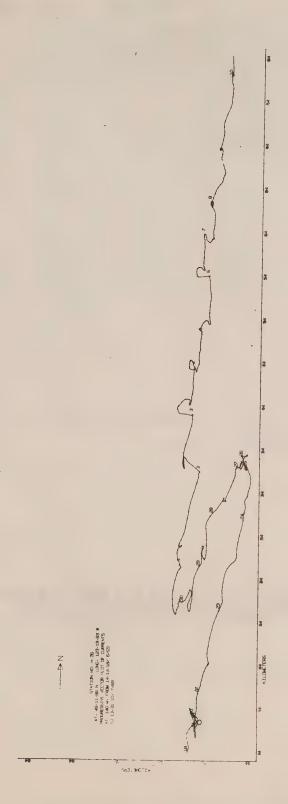
FIG. 22c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 140 METERS DESERVATION PERIOD. FROM 14.13/18/ 6/69 TO 13.31/10/ 7/69

**** * * * *	E. 15 01		~ "	. 0.0	150 200	250	300	350
MEAN		JENCY.		190	150 . 200	1	300	3,0
FEMP.	NO.		I	1	1 1			
7.00	0	Ċ						
7.05	0	.)	2					
7.10	0	. 0	)					
7.20	0	0	υ υ					
7.25	9		9					
7.30	. j	i) )	Ď.					
7.35	0	9	0					
7.40	2	3	0					
7.45	ó	Č.	9					
7.50	()	Š	0					
7.55	Ö	3	o o					
7.60	Š	5	Š					
1.65	o o	. 0	0					
7.70	0	5	5					
7.75	0	0	0					
7.80	0	0	0					
7.85	0	0	1					
7.90	0	Э	0					
795	51	2	)********					
g • 00	36	I	0					
n • 95	14	Ü	0 * * *					
3.10	8	0	0**					
H-15	13	1	0****					
3.20	12	.)	0**					
1.25	75	2	0	***				
8.30	55	2	)********					
9.35	87 78	3	0					
ნ.49 ს.45	95	2	0 * * * * * * * * * * * * * * * * * * *					
8.50	85	3	0*********					
8.55	110	3	()**********					
8.50	172	5						
8.45	236	7	0 ***********			***		
0.73	173	5	5*********		******			
8.75	241	8	)*********					
8.80	135	6	0 **********		********			
8.65	152	5	)**********		****			
8.90	306	10	()*********	********	******	*********	*****	
8.95	265	8	0*********			********		
9.00	151	5	() * * * * * * * * * * * * * * * * * * *					
9.15	198	6	0	**********	**********			
9.10	92	3	3*********					
9.15	64	2	0*******	•				
9.20	40	1	0*****					
9.25	114	4	0					
9.30	49	2	0 *** * * * * * * * * * * * * * * * * *					
NUMBER	OF TEM	P. GRI	EATER THAN 9.3	30 = 0	NUMBER OF OBSE	RVATIONS =	3163	

MEAN TEMP = 8.76 DEG. C.

FIG. 22D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 22-DAY PERIOD DURING JUNE 18 THROUGH JULY 10, 1969.



day period during June 18 through July 10, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location east-west components of current velocity from records obtained at 10-minute intervals over 22-A progressive vector diagram constructed from successive cumulative values of north-south and of the instrument was the same as at this location.

Fig. 22e.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRESTS AT A DEPTH OF 140 METRES UBSERVATION PERIOD, FROM 15.42/10/ 7/69 TO 20.22/24/ 7/69

MEAN SPEED O	0	CT.	0	50 I	100	150 I	500	250 1	300
10 20 30	184 84 99	9 4 5 10	0	******			***		
40 50 60	203 121 171 91	10 6 8 4	0 *******	• • • • • • •					
70 80 90 100	127 74 78	6 4 4	0*****	******		•			
110 120 130	126 94 116	5	0******			•			
140 150 160	49 75 35	2 4 2	0******	•	• •				
170 180 190 200	44 44 23 49	2 1 2	0 ******	• • •					
210 220 230	3 21 8	0 1 0	0***						
240 250 260	9 22 13	0 1 1	0***						
270 280 290 300	24 17 10 4	1 0 0	0***						
310 320 330	4 6 1	0000	0*						
340 350 360	2 3 2	0	0 0*						
370 380 390 400	1 1 1	0 0	0 0 0						
			REATER TI	HAN 4	00 = 0	NUMB	ER OF OBSE	RVATIONS .	2045

MEAN SPEED = 96 MM/SEC

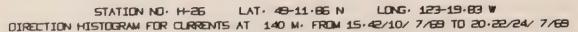
FIG. 23A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 14-DAY PERIOD DURING JULY 10 THROUGH JULY 24, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

DISTOURAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 140 METRES DISERVATION PERIOD, FROM 15.42/10/ 7/69 TO 20.22/24/ 7/69

MEAN	ER20	ULNCY	2 50 10) 150 200 250 300	350 400
olt.	NO.	PCT.	1 1 1 1 1 1 1	1 1
0	99	5	0	•
5	154	b	]***********************	
10	218	11		
15	193	9	0 *************************************	
5.0	145	7	)*******************	
25	113	6	]	
30	84	4	)*********	
35	5.3	3	) ************************************	
40	22	1	10000	
45	19	1	3****	
50	10	)	100	
55	13	1	)****	
60	16	1	3***	
65	14	1	0***	
70	6	Ú	) •	
75	15	1	3000	
40 95	. 2	1	New York	
20	14	1	)***	
•75	13	1	3***	
100	21 8	1	0**	
1.75	3	0	.e.◆	
113	12	1	***	
115	5	ô	U*	
120	ý	Ö	0**	
.25	15	1	9***	
130	9	ō	Ú**	
<b>↓35</b>	13	1	7/***	
.40	17	1	- Conse	
145	11	1	144	
150	13	1	- Owner	
155	21	1	.)****	
150	11	Ł	104	
165	2.0	1	0 * * * *	
1.70	19	1	-J****	
175	14	1	9***	
130	19	1	0***	
192	14	1	)***	
1.30	12	1	V**	
195	12	1	0	
200	13	3	0** >*	
205	5	1	)**	
210 215	12	1	9**	
220	17	1	7***	
225	14	î	0***	
230	9	ن	7) • •	
235	14	1	(***	
240	16	1	3***	
245	8	J	0.00	
250	7	9	○ •	
255	4	ű	Q•	
250	3	U	O+	
265	4	IJ	0+	
270	3	Û	0.	
275	6	O.	G*	
280	6	3	0*	
285	8	9	0 • •	
290	17	0	)***	
295 - 300	11	1	0**	
305	11	<u> </u>	)**	
310	17	i	O***	
315	17	1	C***	
320	19	1	0****	
325	18	1	0****	
330	25	1	O****	
335	23	1	0****	
340	42	2	0 * * * * * * *	
345	42	2	0******	
350	62	3	0	
355	65	3	0*******	

NUMBER OF OBSERVATIONS # 2045

F16. 23B. A HISTOGRAM OF DIRECTION (*TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 14-DAY PERIOD DURING JULY 10 THROUGH JULY 24, 1969.



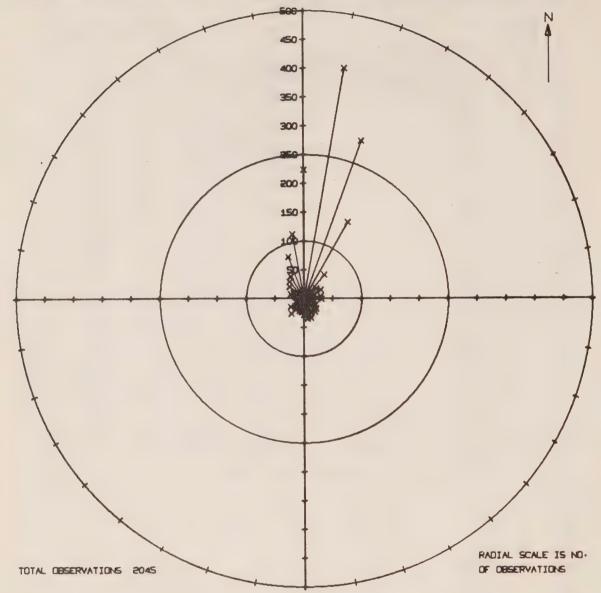


FIG. 23c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 14-DAY PERIOD DURING JULY 10 THROUGH JULY 24, 1969.

LONG. 123-19.83 W

LAT. 49-11.35 N

STATION NO. H-26

HISTOGRAM OF TEMPERATURE (PEG. CERT.) AT A DEPTH OF 140 METERS INSERVATION PERIOD. FROM 15.42/10/ 7/69 TO 20.22/24/ 7/69 FREQUENCY ) 5) 100 150 200 250 300 350 400 450 500 NO. PCT. I TEMP . 5.00 6.20 6.30 1.35 5.47 0.45 5.50 6.55 6:050 c. 55 5.80 6.85 1.10 7.35 1.40 7.45 7.50 7.55 7.50 7.70 7.15 7.00 7.90 5. 15 1.10 1.15 0.30 o.35 1 19 8.40 154 36 5.50 44 0.55 3 *** * * * * * 8.50 4.65 ..... 0.00 9.75 15 .) * * * 8.80 26 0.85 ()********* O-----8.95 49 9.00 9.05 0.10 0 * * * * * 23 .) * * * * * * * 39 0-------------85 7.15 9.20 64 35 9.30 136 1.35 322 9.43 13 ------7.45 78 J............ 9.50 3**** NUMBER OF TEMP. GREATER THAN 9.5. = 0 NUMBER OF OBSERVATIONS = 2045 MEAN TEMP = 9.06 DEG. C.

FIG. 23D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 14-DAY PERIOD DURING JULY 10 THROUGH JULY 24, 1969.



July 10 through July 24, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 14-day period during as at this location. Fig. 23e.

HISTOURAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 140 METRES HISTRYATION PERIOD, FROM 12.23/28/ 8/69 TO 8.22/18/ 9/69

MUAN SPEED		UENCY PCT.		50	100		150	200	250	300
3P (1EU	NO.	PLI.	1	1	1		I	1	1	1
14			ವರಕಾ ಜ	8 5 7 5 3		45 46 46				
20	42	1	7*****							
30	74	2		*****						
40	154	5	0*****			****	****			
50	160	5	()*****	******		****	*****			
60	263	9		******	******	****		*********	********	
70	143	. 5	0 * * * * *	*****	***>***	****	***			
30	203	7	0*****	*****		****	*****	******		
90	131	4	0 * * * * *	******		****				
100	106	4	0 * * * * *	*****	* * * * * * *					
110	170	6	0*****	*****	******	****	*****	*		
120	128	4	0*****	*****		****				
130	157	5	1) * * * * * *	*****		* * * * *	****			
140	74	2	· () * * * * * *	****	* *					
150	139	5	O*****	*****	* * * * * * *	****	***			
160	79	3	O+****	******	* * *					
170	91	3	() * * * * * *	*****	* * * * *					
180	95	. 3	)*****	*****	*****					
190	67	2	0 * * * * *	*****						
200	98	3	0*****	*****	******					
210	68	2		*****						
220	90	3	()*****	*****	****					
230	45	2	0*****	***						
240	4	-	* * * * * * * *							
- j0	<b>၁</b> 0	2	3*****							
260	44	1	0*****							
270	. 44	1	0*****	***						
280	15	1	0***							
290	14	Ō	0***							
300	18	1	0****							
, ,	12	0	0**							
320	15	1	0***							
330	16	1	0***							
340	8	0	0**							
350	8	<u>)</u>	0 * *							•
360 370	2	0	0							
270 280	0	0	0							
390 390	1	0	0							
290	1	U	V							
AUMBER	OF SPE	EDS G	REATER T	HAN 3	90 = 0		NUM	BER OF OBSE	ERVATIONS :	<b>2</b> 999

MEAN SPEED = 124 MM/SEC

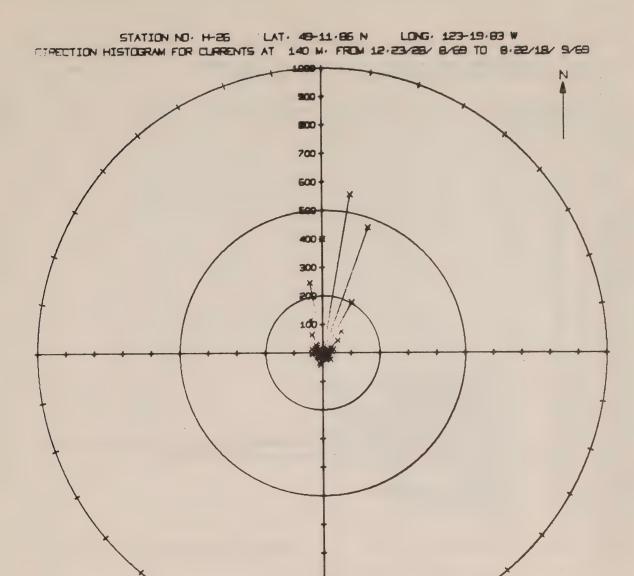
FIG. 24A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 140 METRES DESERVATION PERIOD, FROM 12.23/28/ 8/69 TO 8.22/18/ 9/69

```
300
 50
 350
 400
MEAN
 FREQUENCY 0
 100
 150
 200
 250
DIR.
 NO.
 PCT. I
 187
 6
 10
 294
 269
 10
 250
 20
 274
 25
 162
 115
 30
 35
 40
 0 ******
 50
 37
 20
 55
 0...
 60
 65
 20
 0 ****
 0.444
 15
 0 * * *
 0 ****
 80
 19
 0++
 35
 11
 90
 11
 0 = =
 95
 0 * *
 100
 0 * *
 105
 0 * *
 110
 6
 0.0
 115
 0.000
 10
 0 * *
 125
 0**
 11
 130
 0 . . .
 135
 15
 0 * * *
 140
145
150
155
 14
 0 * * *
 12
 0 * *
 0....
 0 * *
 160
 11
 165
 0.
 170
 10
 0.00
 0.0
 180
 10
 0++
 185
 0 ...
 13
 190
 0 ***
 195
 31
 0 *****
 15
 200
 0.000
 205
 0 = =
 8
 0 * *
 215
 0++
 220
 9
 9**
 225
 9
 0 * *
 230
235
240
 9
 0**
 19
 0
 9
 0++
 245
 0 * *
 250
 0++
 255
 0 ***
 250
 13
 0 * * *
 265
270
 20
25
 0 ****
 0
 275
 12
 0++
 280
 12
 285
 13
 0 . . .
 290
 17
 0 * * *
 295
 22
21
 0 ****
 300
 0 * * * *
 12
 305
 0**
 310
 19
 0 ****
 0 * * *
 320
325
 17
 0 * * *
 27
 330
 38
 335
 38
 340
 63
 345
 89
 350
 121
 355
 127
```

NUMBER OF OBSERVATIONS = 2999

FIG. 24B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.



RADIAL SCALT : 34

FIG. 24c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.

TOTAL DESERVATIONS 2999

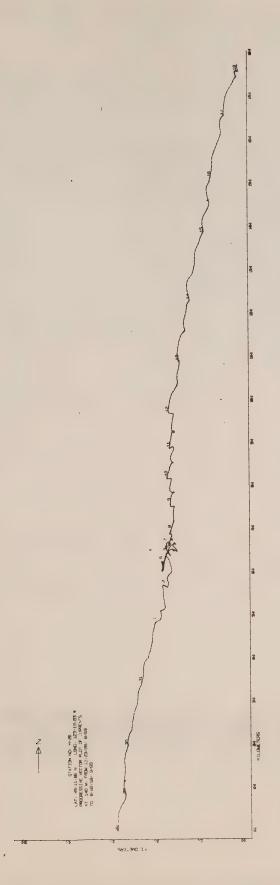
BISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 140 METERS TESERVATION PERIOD, FROM 12.23/28/ 8/69 TO 8.22/18/ 9/69

MIAV	FREQUE	ENCY	0	100	200	300	400	500	600	700
TEMP.			I -	I	I	. I	I	I	I	1
3.00	0		0							
8.05	0	0	0							
8.10	0	0	0							
0.15	0	2	()							
8.20	ن	0	)							
0.25	0	0	0							
8.30	0 .	Ü	0							
8.35	0	0	9							
8.40	. 0	U	0							
8.45	0	0	0							
8.50	0	0	0							
8.55	0	0	0							
3.60	2	0	0							
3.65	0	0	0							
3.70	0	Ó	ŋ							
8.75	U	0	0							
8.80	0		.0							
8.95	0	0	Û							
8.90	0	0	0							
8.95	1	0	0							
9.00	33	1	0***							
9.05	265	9	0 * * * * *		********	***				
9.10	147	5	0 ****		**					
9.15	259	9	0 ***	******	*******	***				
9.20	216	7	() * * * * *	*******	*******					
9.25	270	9	0 * * * * *	******		***				
9.30	637	21	0 ****	*******	********	********	********	********	********	•
9.35	475	16	0 ****	******	********	********	*******			
9.40	178	6	0 * * * * *	*******	****					
9.45	60	2	0 * * * * *							
9.50	209	7	0****	******	*****					
9.55	113	4	0 ****	*****						
9.60	120	4	()****	******						
9.65	16	1	0 * *							
9.60	120	4	()****							

NUMBER OF TEMP. GREATER THAN 9.65 = 0 . NUMBER OF OBSERVATIONS = 29%

MEAN TEMP = 9.29 DEG. C.

FIG. 24D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 21-DAY PERIOD DURING AUGUST 28 THROUGH SEPTEMBER 18, 1969.



components of current velocity from records obtained at 10-minute intervals over 21-day period during August 28 through September 18, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the A progressive vector diagram constructed from successive cumulative values of north-south and east-west same as at this location.

Fig. 24e.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 140 METRES 1957AVATION PERIOD, FROM 11. 2/18/ 9/69 TO 9.16/16/10/69

MEAN SPEED	NO.	PCT.		1	1 20	150 I	1 200	250	30C 1	350 I
. 0	1		<u> </u>							
10	192	5	0	*******			•			
2.0	94	2		******						
30	93	2	(********	*******						
40 50	227 168	6.4					********			
- 5	287	7	0						_	
70	181	5	)******						•	
.:0	267	7	0 * * * * * * * * * *							
70	156	4	0*******			****				
170	159	4	0			****				
110	232	6	)******							
120	113	3	0 ********							
130	129 -	_	0 *******							
143	99	2	·		* #					
150	* 74			******		******				
160	137	,	) * * * * * * * * *							
170	114	3	)********	*****						
CEL	125	3	.)********	******	*****					
190	91	?	?********	******						
200	137	3	1)*******	* * * * * * * *						
10	0.7			*****						
200	137	3	() ********		******					
060	67	2	.)*******							
240	79	2	3********							
190	103	3			* * * *					
251)	75	2	9********							
270	73	2	)*********	****						
230	45 55	1	0							
300	36	1	0******	*						
313	17	0	C+++							
320	22	1	1)***							
333	23	1								
340	22	1	)****							
350	7	å	.1#							
56.0	2	Ĵ	<b>○**</b>							
570	7	3	2.0							
200	2	J.	′)							
370	3	Ċ	0							
470	1	C	)							
410	3	C	n *							
420	2	J	)							
430	2	9	Ç							
440	1	0	O							
45)	1	)	3							
40435K	OF SPEC	DS GF	REATER THAN	450 =	ز	NUMBER	OF OBSERV	ATIONS =	4021	

MEAN SPEED = 132 MM/SEC

FIG. 25A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 140 METRES OBSERVATION PERIOD, FROM 11. 2/18/ 9/69 TO 9.15/16/10/69

						•					
<b>Mと N N</b>	FREQU			100	150	200	250	300	350	400	450
DIR.		PCT.		I	I	I	1	I	I	1	I
)	350	9	0	********	******	•••••	*********	********			
5	297	7	0 *** * * * * * * * * * * * * * * * * *				********	****			
10	30)	7	0		• • • • • • • •	*********	•••••	*****			
15	277	7	0 ***********		•••••	*********	**********				
20	400	10	0					********	*********	*****	
2.5	236	6	0 **********			*********	****				
30	161	4	) * * * * * * * * * * * * * * * * * * *								
35	125	3	0 **********		*						
40	111	3									
45	99	2	0 * * * * * * * * * * * * *								
50	7 3	2		* *							
55	27	1	C****								
60	47	1	0								
55	38	1	) * * * * * * * *								
7C .	43	1	0								
75	37	1	)******								
3.)	35	1	0 ******								
85	2.2	1	0****								
'70	17	ű.	0***								
. 75	17	U	)***								
100	20	J	)***								
105	13	3	)****								
110	9		·) * *								
115	1)	Ú.	) * *								
150	3	5	()**								
125	18	)	O****								
130	31	1	0*****								
135	23	1	0****								
140	50	0	7***								
145	15	.)	7***								
150	1.5	5	0***								
155	13	.)	0***								
ょうひ	25	l	O****								
165	47	1	0****								
170	21	1	0 * * * *								
175	28	1	0*****								
1-0	27	ì	7****								
155	21	1	)****								
1 10	20	Ü	0****								
732	21	1	0****								
200	13	2	0***								
≥ 15	10	9	)**								
21)	5	0	0.*								
215	5	n	O#								
2?3	2	.)	-0								
225	5		1) *								
230	4	0	0.0								
235	4	3	0*								
240	)	J.	)								
245	2	0	0								
2.50	9	2	)**								
255		0	)***								
260 255	13	C)	J***								
			0***								
270 275	15 5	0	0.								
			0*								
280 285	3 2	0	0								
290	ģ	ő	0**								
275	16	0	0								
300	15		0+**								
305	13		0***								
310	12		0**								
315	16		0***								
320	17	3	)***								
325	19		O***								
330	18		J****								
335	48	1	0******								
340	73	2	9********	**							
345	95	2	0								
350	192	5	3		******						
355	266		0								
1.13	200										

NUMBER OF OBSERVATIONS = 4021

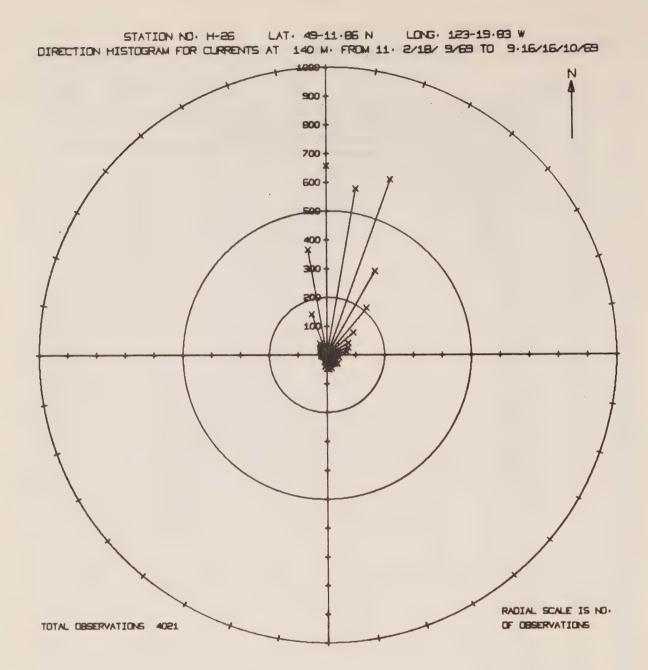


FIG. 25c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 140 METERS OSSERVATION PERIOD, FROM 11. 2/137 9/69 TO 9.16/16/10/69

7 2 100 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	73u I	I	ı	I	1	I	ī	1	100
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		·							
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
0 0 0 0									
0 0 0									
0 0 0									
0 0									
3 0 0									
0									
0									
1,5									
0									
	**********								
•									
	**********	*******	********	**					
0	**********					•			
0									
0			****						
-									
	7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	10 00 00 00 00 00 00 00 00 00 00 00 00 0	10 10 10 10 10 10 10 10 10 10				10 10 10 10 10 10 10 10 10 10	1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

FIG. 25D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 28-DAY PERIOD DURING SEPTEMBER 18 THROUGH OCTOBER 16, 1969.

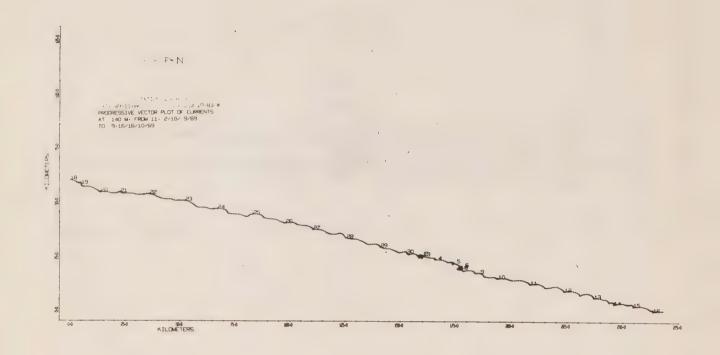


Fig. 25e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 28-day period during September 18 through October 16, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 140 METRES DESCRIVATION PERIOD, FROM 14.19/16/19/69 TO 8. 9/25/11/69

MEAN	FREQUI			100	150	. 200	250	. 300	350	400	450	500
SPEED	NO. 1	0	I I	I	1	1	1.	I	I	I '	I	I
10	217	4	0									
20	109	2	0									
30	152	3	() * * * * * * * * * * * * *	*********	******							
40	347	6	0 *** *** *** ***	*********		• • • • • • • • • • •		••••••	*****			
50	235	4	0********		********	*********						
60	388	7	0		*******	*********		********	• • • • • • • • • •	****		
70	229	4	0		• • • • • • • • • •		• • •					
ยง 90	424 255	7	0 *** * * * * * * * * * * * * * * * * *					*****		•••••	•	
100	224	4	0	**********								
110	318	6	9 *** * * * * * * * * * * * * * * * * *	********				*******	•			
120	263	5	Q	********								
130	354	6	0		*******			********	******			
140	203	4	() * * * * * * * * * * * * * *	*******	• • • • • • • •	******						
150	323	6	0********	********		*********	• • • • • • • • • •	********	• •			
160	156	3	0		******							
170	152	3	()*********	*******	*****							
180 190	207 111	2	0 **********	**********	•••••	*******						
200	167	3	1) 4 * * * * * * * * * * * * *									
210	101	2	0			•						
220	137	2	0 *** * * * * * * * * * * * * * * * * *									
230	69	1	0 **********									
240	57	1	0 * * * * * * * * * * * *									
250	82	1	Ú******	* * *								
260	46	1	0 * * * * * * * * *									
270	62	1	0 *** * * * * * * * * * * * * * * * * *									
280	33	1	0*****									
290 300	51 37	1	0 * * * * * * * * * * * * * * * * * * *									
310	29	1	0 *** * * *									
320	37	i	0*****									
330	- 24	ō	0 ****									
340	26	O	0****									
350	20	0	0****									
360	21	Ü	0****									
370	6	0	2*									
390	.9	0	0**									
390	14	0	0***									
400 410	15 11	Ü	0***									
420	0	Ü	0									
430	2	ő	0									
				30 = 0	NUI	MBER OF OBS	ERVATIONS	= 5723	MEA	N SPEED =	126 MM/SE	С

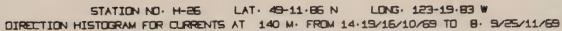
FIG. 26A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 140 METRES DESERVATION PERIOD, FROM 14.19/16/10/69 FO 8. 9/25/11/69

MLAN	FREQUENC	Y	0 100	200	300	400	500	600 70	0
DIR.	NO. PCT	Γ.	1 1	. I	I	1	I	I	1
0			() * * * * * * * * * * * *				· ·	-	•
		7	0						
,									
10		7	O**********						
15	400	7	0						
20	513 5	y .	J**********		*******				
25	289 5	5					ę		
30		3	0						
			0						
35		-	-						
40	99 2		() * * * * * * * * * *						
45	117 2	2	0						
50	91 2	2	0						
55	60 1		0						
60	49 1		0 * * * * *						
			0 * * * * * *						
65	56		*						
70	37 1		0 * * * *						
75	47 1		7 * * * * *						
9.0	35		0+++						
115	5.5	١	> + +						
20	26	-	1868						
95	21 0	,	)**						
100	33 1		0 * * *						
1 1 5	29 1		0***						
110	21	)	1) * 4						
115	20 :	)	3**						
127	19 0		0 * *						
125	23 1		0 * * *						
			1) * 4						
130									
135	24		0**						
14.)	27 :	١	0 * * *						
145	35 1		2****						
.50	37 1	l	() * * * *						
155	25		O+++						
150	25		)***						
165	55 1		0++++						
176	58 1	l	) * * * * * * * * * * * * * * * * * * *						
175	52 1		0 * * * * *						
180	49 1		C * * * * *						
185	65 1		)*****						
190	57 1		7*****						
195	32 1		0 * * *						
200	25 0	)	0 * * *						
205	- 2 -		2.25 No. 25						
210	21 .		J**						
215	20 0	,	0 * *						
220	18		0**						
225	22 0		3**						
230	21 0		0**						
235	34 1		9***						
240	23		7**						
245	17		0 * *						
250	15 0	)	0**						
255	13 3	)	0 * *						
260	17 0		0 * *						
265	8 3		0*						
270	13		0*						
275	20 0		0 * *						
290	14 0		0 *						
285	19 1	)	0 **						
290	25 U	)	0***						
295	22 0		7**						
300	16 0		0**						
305	21 (		2**						
310	24 0		0**						
315	47 1		0 * * * * *						
320	59 '		2 * * * * *						
125	62 1		0#4###						
330	75 1		0 * * * * * * * *						
335	103 2		0						
340	136 2		0 * * * * * * * * * * * * * * * * * * *						
345			0 = = = = = = = = = = = = = = = = = = =						
350	234 4		0 * * * * * * * * * * * * * * * * * * *						
55 د	292 5	>	() * * * * * * * * * * * * * * *	*********	****				

NUMBER OF UBSERVATIONS = 5723

FIG. 26B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.



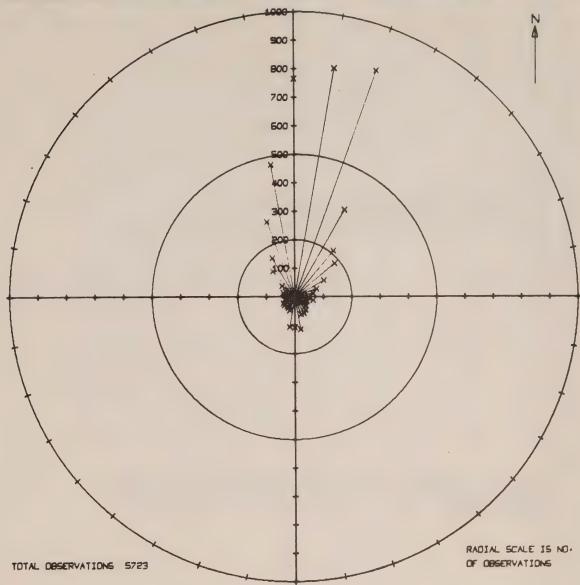


FIG. 26c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 140 METERS
JUSTRVATION PERIOD, FROM 14.19/16/10/69 TO 8. 9/25/11/69

4 AV	FREGI	UENCY	0	200	400	600	800	1000 .	1200	1400	1600	1800	2000
ILKP.		PCT.		. 1	I	I	I	I	· I	1	I	I	
5.00	(1	1	J										
1.05	0	0	)							. `			
0.10	)	0	)										
1.15	0	Ų	7										
3.20	0	')	7										
8.25	2	٤	0										
3.30	Э	0	0										
1.35	0	0	0										
8.40	0	)	()										
45	0	0	n										
8.50	3	O	)										
5.55	0	U	)										
h.60	•)	0	)										
3.65	0	O.	).										
3.70	)	.)	)										
5.75	0	0	i)										
8.40	326	6	0		***								
4.00	1225	21	)****			*********	*********	*****	******				
8.90	1033	18	() * * * *	*******		*********	**********						
8.75	750	13	0 * * * *	*******	• • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	****						
9.00	1378	24	() * * * *	*******		******	*********	*****	********	*****			
95	1000	13	)****	• • • • • • • • •			**********	****					
9.10	3	Ų.	)										
9.15	2	3	0										

FIG. 26D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 40-DAY PERIOD DURING OCTOBER 16 THROUGH NOVEMBER 25, 1969.



A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 40-day period during October 16 through November 25, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of instrument was the same as at this location.

Fig. 26e.

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 140 METRES OBSERVATION PERIOD, FROM 10.27/25/11/69 TO 2.11/11/12/69

MEAN	FREQUEN		)	50		100	150		200	2	250	300
SPEED	NO. PC	Ŧ.	I	1		I	I		I		I	I
3	5	Ų	0									
1 -	1.75	8	)****	*****	*****	*****						
20		2	0	*****	+							
30	69	3	O									
4 C	163	7	0****		****		*****					
50	141	5				*****						
5)	253 1	1	^****		*****	*****		* * * * * * *				
70	150	7	7****	*****	*****	****	*****					
au	195	)					******					
90	113	5	O****		*****	****						
100	11"	ر	3****									
110	138	6	0 ****			*****	****					
120		4	)****	*****	****							
130		5	0 * * * * *		*****	****	**					
140		3	()****		***							
150		4			*****	**						
160	47	2	()****	***								
170	35	2	0****	**								
180	57	3	()****	*****	,							
190	38	2	0 * * * * *	* * *								
200	31	1	·) * * * * *	*								
210	19	1	0 * * * *									
220	13	1	)***									
230	5	Ü	<b>∂</b> #									
240	2	C	0									
250		0	Ú#									
260		O	0.4									
270		1	0**									
280	3	Э	0 *									
290	4	0	0*									
300	÷	0	0*									
310		0	0*									
320		J	0+									
330		J	0 *									
340		J	0									
350		C	)									
360		()	Ó									
370		Ü	)									
380		0	9*									
390		0	0									
400		C	)									
410	4	1)	0*									
NUMBER	UF SPEEDS	GF	REATER	THAN	410 =	: 0		NUMBER	DE UI	BSERVAT	11045 =	2255

MEAN SPEED = 94 MM/SEC

FIG. 27A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 15-DAY PERIOD DURING NOVEMBER 25 THROUGH DECEMBER 11, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

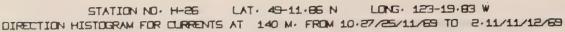
LAT. 49-11.86 N LONG. 123-19.83 W

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 140 METRES OBSERVATION PERIOD, FROM 10.27/25/11/69 TO 2.11/11/12/69

MCAN	EREDU	LE NIC V	າ 1	0 20	30	40	50	60	70	80	90 1
DIR.		PCT.		0 20 I I	I	I .	I	I	. 1	I	90 1 I
0	<b>7</b> 5	4			******					*******	*****
5	-14	4	0*******		*********	******				******	
10	7 7	3		***********							
15	6.7	3		***********							
20	37	4		* * * * * * * * * * * * * *						*******	
25 <b>3</b> 0	74 62	3									
35	43	5						• • • • • • • •			
4(1	27	1		***********							
45	40	2				****					
50	3?	1	^*******		******						
55	26	1	· · · · · · · · · · · · · · · · · · ·	* * * * * * * * * * * * * *	***						
60	37	1		* * * * * * * * * * * * * * * * * * * *							
65	31	1		***********	******						
<b>7</b> 0	13	1	0 ******								
75 80	1 H	1	0******	• • • • • • • • • • • • • • • • • • • •							
85	31	1		**********	******						
90	25	1		**********							
95	20	ī		********							
100	13	1	)******	***							
105	2.5	1		********							
110	11	0	()******								
115	2.2	1		**********							
120	1.4	1	0 * * * * * * * * * * * * * * * * * * *								
125 130	18 15	1	7*******								
135	12	1	0								
140	12	1	0								
145	8	- 0	<b>******</b>								
150	ly	()	() * * * *								
155	9	2	()*******								
160	34	2									
165 170	36 31	2				•					
175	34	2									
180	46	2		**********							
185	54	2		**********							
190	51	2	0*******	*********	********	******					
195	3.7	2		* * * * * * * * * * * * * * * * * * * *							
200	42	2		**********							
205 210	60 35	3									
215	24	1		***********							
220	12	î	)******		-						
225	10	()	0 *******								
230	11	U	)******	* *							
235	11	U	^*******	* *							
240	4	·)	)***								
245 250	11	)	7***** ^*****	**							
250	13	)	0								
260	12	1	3******								
265	14	i	9*******								
270	10	0	0*******	•							
275	10	0	0******	*							
280	7	Ú	0 * * * * * *								
235	14	1	3*******								
290	15	1	0****	*****							
295 300	15	Ų	2****								
305	22	1		**********							
310	26	i		**********	***						
315	26	1									
320	3.8	2		* * * * * * * * * * * * *	********	***					
325	1.7	1	0******								
330	45	2									
335 340	62 74	3	_	***********							
345	91	4		***********							*****
350	69	3		**********							
355	65				********	*******		*****	•		

NUMBER OF UBSERVATIONS = 2255

FIG. 27B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 15-DAY PERIOD DURING NOVEMBER 25 THROUGH DECEMBER 11, 1969.



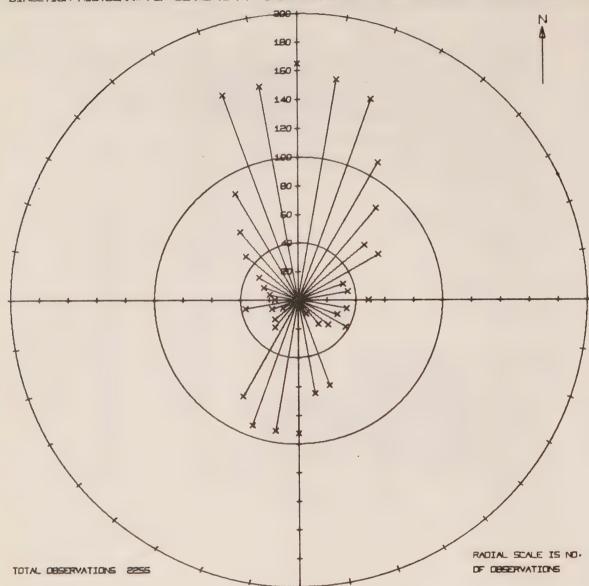


FIG. 27c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 15-DAY PERIOD DURING NOVEMBER 25 THROUGH DECEMBER 11, 1969.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 140 METERS OBSERVATION PERIOD, FROM 10.27/25/11/69 TO 2.11/11/12/69

MEAN	FRED	UENCY	0	190	200	300	400	500	660	. 700	800	900	100
TEMP.		PCT.		I	1	1	I	1	ĭ	1	1	1	100
8.00	0	- 0				-			-	•	•	*	
8.05	7		0										
8.10	J	J	2										
8.15	1	0	O.										
8.20	9	.2	2										
8.25	0	0	n										
8.30	3	:)	n	,									
h.35	0	17	0										
8.40	49	2	3****										
8.45	54	2	0 ****										
8.50	17	1	0**										
8.55	108	5	^*****										
8.60	122	5		*****									
8.65	277	1.2				***							
8.70	267	12	.)*****	*******		***							
6.75	730	32	.)			******	******	* * * * * * * * * *		*******			
6.80	222	10	O****	*******									
8.85	112	5	)*****	****									
8.90	160	7		******	• •								
8.95	100	4		****									
9.00	3.1	1	() * * *										
9.05	5	.)	⊕#										
NUMBER	UF TEM	P. 6:31	EATER TH	1AN 9.J5	= 0	NUMB	ER OF OBSER	RVATIONS =	2255	MEAN	TEMP = 8	.73 DEG. C.	

FIG. 27D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 15-DAY PERIOD DURING NOVEMBER 25 THROUGH DECEMBER 11, 1969.

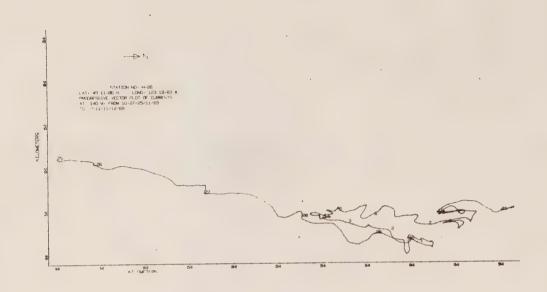


Fig. 27e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 15-day period during November 25 through December 11, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

STATION NO. H-26 LAT. 49-11.do N LUNG. 125-17.83 W

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 140 METRES DESERVATION PERIOD, FROM 12.46/ 9/ 1/70 TO 13.47/19/ 2/70

V: 1V	FREQU			100	200	300	400	500	600	700
SPEED	NO.	PCT.		I.	1	1	1	1	1	1
10	400	1	9******							
50	125	2	0							
30	169	3			• •					
40	365	6	()******							
زاد	344	>	) * * * * * *	******		******				
6.1	195	10	)******	****		*****			*****	
7.)	461	8	.)******	******	*******		******	***		
9.0	565	10					********	*******		
30	355	5	0 ****				***			
100	307	5				* * * * * * *				
110 125	376 203	6				• • • • • • • • •	****			
130	285	÷	0							
140	144	2	0*****							
150	222	4	0							
460	144	2	3*****							
170	120	2								
130	145	2	0*****	******						
1 +0	85	1	A	* *						
200	91	2		* *						
210	65	1	U*****							
220	75	1	J	•						
230	37	1	0***							
240	24	٠,	·) * *							
250	34	1	)***							
250 270	36 40	1	0****							
280	1.5	1	)**							
290	15	J	048							
300	,0		ć*							
310	10	é	5+							
320	3	Ü	0							
330	10	0	() »							
140	5	0	<b>1</b> *							
35%	1'	Ċ	٦							
350	1 '	5	0							
4UMTLE3 (	F SPEC	US 3º	REALE? TH	AA 350	= J	NUM	BER OF OBSI	ERVATIONS :	= 5890	

MEAN SPEED = 97 MM/SEC

FIG. 28A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 41-DAY PERIOD DURING JANUARY 9 THROUGH FEBRUARY 19, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

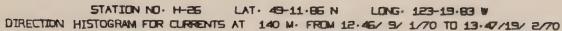
CITED OF THE PERSON OF THE PER

GISTORRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 140 METRES IS SERVATION PERIOD, FROM 12.46/ 9/ 1/70 TO 13.47/19/ 2/70

MLAN	FREQU	JENCY	0 50	100	150	200	250	300	350	400
UIR.	NO.	PCT.		1	i	1	1	1	1	I
0	194	3				*****				
5	143	2	0	********						
10	133	2	0 * * * * * * * * * * * * *	*******						
1.5	127	2	0 * * * * * * * * * * * * * *							
2.0	137	ż	0 ***********	******						
25	128	2		*******	* * *					
1.	113	à	7**********	*******						
3.5	121	2	-	*******	•					
% J	141	2		********						
45	114	2								
90	117		.)**********							
95	118	2	3 * * * * * * * * * * * * * * *		•					
6.1	84	i	0	***						
25	59	1	( *********							
7.)	63	1	>*****							
75	65	1	0 * * * * * * * * * * * * * * * * * * *							
80	50	1	) *********							
35	43	1	.)*******							
90	56	1	0 *******							
95	36	1	0.000000							
100	4.)	1	30000000							
103	60	- 1	() * * * * * * * * * * * * * * * * * * *							
110	43					·				
115	44	1	0 *****							
120	44	1	0 * * * * * * * * * * * * * * * * * * *							
130	42	1	3******							
	59	1	•)*******							
135 140	50 49	1	(							
145	50	1	)*******							
153	45		7******							
155	44	ž	(, * * * * * * * *							
166	33		3 *** * * * *							
165	47	1	9******							
176	51	1	-							
175	71	1	C							
180	56	1	0							
185	92	2	(**********							
140	40	2	()**********							
195	89	2	)*********							
200	107	2	)*********							
2.75	67	1	0 * * * * * * * * * * * *							
211	43	1								
215	30	1	0 * * * * *							
273	25	Ū.	()****							
225	14	J	9000							
233	23	J	0 * * * * *							
235	20	0	0 * * * *							
1:40	1.2	3	0**							
145	26	0	1) ****							
250	30	1	0 * * * * * *							
255	24	0	0 * * * * *							
260	25	0	0 * * * *							
265	12	0	0**							
270	24	Ç.	3****							
75	3:0	1	C+++++							
290	35	1	0							
285	42	1	0******							
290 295	46	1	0 * * * * * * * *							
300	46 59	ì	~******							
300	59 68	1	0********							
310	100	2	0							
315 315	113	2	0 *** *** *** ***							
320	143	2	0							
325	160	3	0							
330	230	4	0 *** * * * * * * * * * *				* *			
335	259	4	0 * * * * * * * * * * * * * * * * * * *				* * 4 * * * * 7			
340	267	5	() * * * * * * * * * * * * * *				******			
345	243	4	3*********							
350	225	4	0 *** * * * * * * * * * * * *							
355	201	3	) **********							
MILIMPEA	HE OUCE	BVATE	046 - 5000							

NUMBER OF OBSERVATIONS = 5890

FIG. 28B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 41-DAY PERIOD DURING JANUARY 9 THROUGH FEBRUARY 19, 1970.



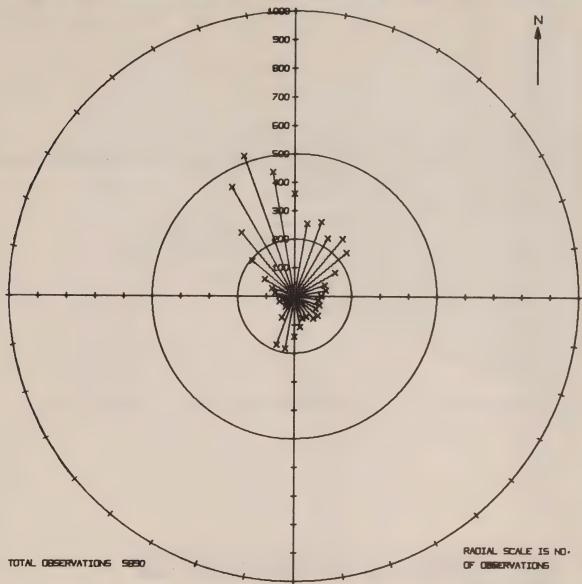


FIG. 28c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 41-DAY PERIOD DURING JANUARY 9 THROUGH FEBRUARY 19, 1970.

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 140 METERS
DESERVATION PERIOD, FROM 12.46/ 9/ 1/70 TO 13.47/19/ 2/70

MEAN	FREQUE	NC V	a	50	100	150	200	250	300	350	400	450	500
I_MP.		CT.		1	1	1	1	I	1	1	1	1	1
7.00	0	0		*	•		•			•	•	•	•
1.05	ő	Ü	0										
1.10	ŏ	0	2										
7.15	Ö	0	0										
1020	0	Ú	0										
7.25	Ö	Ü	0										
7.30	0	Ü	0										
7.35	0	0	Ó										
7.40	o	õ	0										
1.45	1	J	0										
7.50	75	1	0****										
7.55	253	4	0 ****		*******			******					_
7.60	218	4	0 * * * * *				*******						
7.65	493	3	0 * * * * *		******	********	*******	*******		*******		********	
1.70	312	5	0 * * * * *		******	********	*******	********					
7.75	200	3	0 * * * * *		******	********	*****						
7.80	220	4	0 * * * *		******	*******	*******	•					
7.85	211 .	4	0 ****		******	*******	*****						
7.90	155	3	()****		*******	*****							
7.95	210	4	-			*********							
~. DO	326	5	0		*******	********	********	********					
0.05	352	6	0		*******	********	******	********		*****			
8.10	359	0				********	*******	*******		******			
5.15	367	6	0		*******		*******	******	• • • • • • • • • •	********			
5.20 8.25	252 287	5	0 * * * * *										
5.30	242	4	0****					*****	••••				
2.35	237	4	0****					****					
8.40	211	4	0****					***					
J. 45	217	4	0										
5.50	166	3	0 * * * * *	********									
e • 55	94	2	0 * * * * *										
٥.60	140	2	0 * * * * *			****							
8.65	107	2	0		*****								
8.70	84	1	() * * * * *										
8.75	51	1	) * * * * *	****									
8.80	3.8	1	0 * * * * *										
h.85	12	0	() * *										
18M3EK	OF TEMP.	GRE	EATER 1	THAN 8.85	<b>=</b> 0 .	NUMBE	R OF OBSE	RVATIONS =	5890	MEAN	TEMP = 8.	06 DEG. C	•

FIG. 28D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 41-DAY PERIOD DURING JANUARY 9 THROUGH FEBRUARY 19, 1970.



components of current velocity from records obtained at 10-minute intervals over 41-day period during January 9 through February 19, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the A progressive vector diagram constructed from successive cumulative values of north-south and east-west same as at this location.

Fig. 28e.

5TATION NO. H-26 LAT. 49-11.36 N LONG. 123-19.83 W

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 140 METRES INSCRIVATION PERIOD, FRUM 15.48/19/ 2//0 TO 10.13/25/ 3/70

4. A V	FREQUENC		50	100	150	200	250	300	350	400	450	500
SPEED	NU. PCT		I	Ĭ	I	I	1	1	1	I	1	I
0 10	0 0											
20	80 2		******									
30	88 2		******									
4.0	261 5					********						
50	204 4	0 *****				******						
50	277 6	J*****				******		* *				
70	180 4	() * * * * * *		********	• • • • • • • •	***						
10	296 6		******		******	********	• • • • • • • • • •	*****				
30	260 5				******	********						
100	266 5			*********	********							
110	430 B 250 5		******		*******			*********		******		
130	312 6											
140	218 5		******			*********						
150	237 5	-	******		*******							
160	121 3			*******								
170	154 .3	0*****	******	*******	******							
190	197 4	0 * * * * * *	******	********	******	*****						
190	124 3	0 *****	*****	********	*							
200	169 3		******	********	******							
210	89 2											
220	121 3	-		********								
230 240	79 2		******	* * *								
250	67 1											
260	34 1											
270	30 1	*	-									
290	26 1											
630	33 1		*									
300	23 0	3****										
310	10 0	0 * *										
320	11 )	O = +										
330	4 0											
34)	.3 0											
350	4 0											
360	2 )	0										
NUMBER (	OF SPEEDS	GREATER T	HAN 36	C = 0	NUM	BER OF OBSI	ERVATIONS =	= 4838	MEAI	N SPEED =	122 MM/SE	С

FIG. 29A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

STATION NO. H-26 LAT. 49-11.86 + LONG. 123-19.83 M

HISTO WAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 140 METRES UNSERVATION PERIOD, FROM 15.46/10/ 2/77 TO 10.13/25/ 3/70

```
FREDUENCY 1
 20
 200
ar. Av
 13
 150
 250
 300
 350
 400
 450
 50
JER.
 PCT. I
 NU.
 10
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 (*****************
 15
23
25
 133
 142
 45
 33
 50
55

 32
 30
 ()*****
 0 * * *
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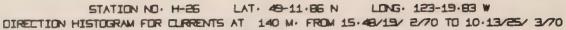
 1) # #
 50
 ()***
 30
 3**
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 1,44
 1.75
 .) * *
 1144
115
) # #
 0.0
135
 0**
140
)***
 0 * * *
145
 13
 .) * *
 (....
)***
165
 0 0****
170
 -)****
175
 15
 ○ * * * *
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200
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230
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 0 * * * *
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275
 0***
230
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290
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300
 46
)********
305

 40
310
325
 128
 330
 147
135
 165
140
 213
251
 355
 325
```

4UMBER OF JBSERVATIONS = 4836

FIG. 29B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970.



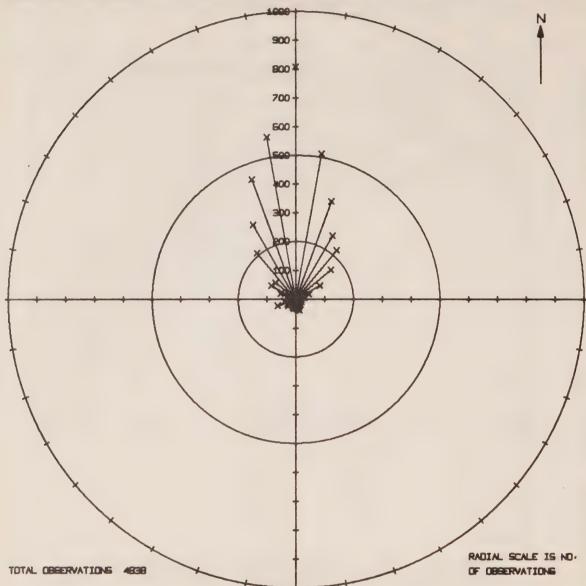


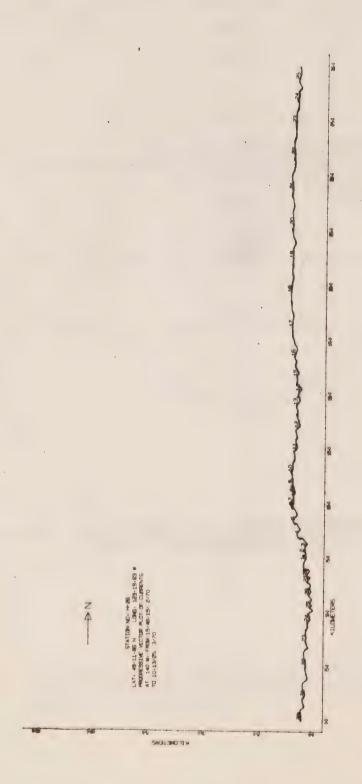
FIG. 29c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970.

STATION NO. H-26 LAT. 49-11.96 N LONG. 123-19.83 W

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 140 METERS DESERVATION PERIOD, FROM 15.48/19/ 2/70 to 10.13/25/ 3/70

MEAN	FREQUE			100	200	300	400	500	600	700	800	900	100
FEMP.	NO. P	CT.	1	1	I	ī	I	I	1	I	1	, I	
7.00	O	C	)										
7.05	0	- 0	0										
7.10	5	0	0										
7.15	0 .	U	0										
1.20	0	Ü	0										
1.25	2	0	0										
7.30	a	()	7										
7.35	0	U	5										
7.40	9	0	0										
1.45	0	J	5										
7.50	)	C-	0										
7.55	2	J	0										
7.60	Ö	3	0										
7.60	456	13			*********			* * *					
7.70	600	12			********	******	********	********	*****				
7.75		17				*******		********			********	•	
7.80	558	12	0			*******	******	********					
7.85	424	9	0 *****				*******						
7.90	329	7	0			*******							
1.95	275	5											
3.00	233	5	0										
3.05	165	3			****								
3.10	182	+	()*****		****								
3.15	203	4	.) * * * * *		******								
0.20	134	3	)*****	******									
0.25	135	3			*								
8.30	126	3	0*****										
3.35	05	1	0 ****										
8.40	62	1											
0.45	33	1	.) * * *										
d.50	16	G	0 * *										
	-												
*UMPER	UF TEMP.	GRI	EATER TH	HAN 8.5	0 = )	NUMB	CR OF UBSE	RVATIONS =	4838	MEAN	TEMP = 7	.89 DEG. C	•

FIG. 29D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 34-DAY PERIOD DURING FEBRUARY 19 THROUGH MARCH 25, 1970.



components of current velocity from records obtained at 10-minute intervals over 34-day period during February 19 through March 25, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the A progressive vector diagram constructed from successive cumulative values of north-south and east-west same as at this location.

Fig. 29e.

STATION NO. H-26 LAT. 49-11.86 V LONG. 123-19.83 W

HISTOGRAM OF SPEED (MM/SEC) FOR CORRECTS AT A DEPTH-OF 140 METRES DESERVATION PERIOD, FROM 13.13/25/ 3/70 FO 15. 6/27/ 4/70

MEAN	FREQU			107	150	500	250	300	350	400	450	500
SPICED 0	VU.	PLI.		1	ī	1	1	1		1	1	1
15	329	7										
20	118	2										
3.0	133	3	)********		***							
40	264	6	0 * * * * * * * * * * * * *									
50	246	5	3**********	*******		*******	*****					
50	451		:)*********							********	*****	
7)	3.)5	6	3**********	********								
40	468	7					*******			*******		
90	272		5*********					•				
100	245		] * * * * * * * * * * * *									
110	329		9 *** * * * * * * * * * *				********	********	***			
120	188											
130	270		() * * * * * * * * * * * *				*********	W M				
140	151	.3	1)********									
150	186	4	.) * * * * * * * * * * * *		*********	***						
160	100	-	0									
170	100	_	()*********									
18ŭ	139	3	) **********		****							
190	71	_	J									
200	115	_										
210	70											
220	86 49	40	()**********	****								
230 240	37	1	1000000									
250	26	1	)****									
250	7	3	20									
273	7	)	1.0									
230	3	5	0.0									
290	7	j j	3 4									
320	6	Ü	7#									
310	1	į,	0									
520	2		)									
22.3	4	,	,									
NUMBER C	F SPEE	DS 34	REATER THAN 3	20 = 200	NUME	BER OF OBS	ERVATIONS :	= 4738	MEA	N SPEED =	99 MM/S	EC

FIG. 30A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING MARCH 25 THROUGH APRIL 27, 1970. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

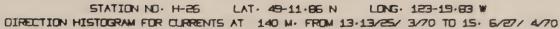
STATION NO. H-26 LAT. 49-11.40 N LONG. 123-19.83 W

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 140 METRES DESCRIVATION PERIOD, FROM 13.13/25/ 3/70 TO 15. 6/27/ 4/70

MEAN	FREQUENCY	0 50 100 150 200 250 300 350 400
DIR.	NO. PCT.	
C	263 6	
5	203 4	0
10	178 4	0
15	136 3	()
23	108 2	0.0000000000000000000000000000000000000
2.5	85 2	0.0000000000000000000000000000000000000
30	93 2	0.0000000000000000000000000000000000000
35	62 1	0 *********
40	88 2	0 **********
45	88 2	9************
50	71 1	)**********
55	75 2	0********
50	89 2	0
65	47 1	9444444
70	47 1	7*******
75 30	62 1 40 1	7
85	38 1	
90	39 1	()************************************
95	38 1	0.848888
100	31 1	0.0000000000000000000000000000000000000
195	34 1	0******
110	28 1	
115	23 0	0****
120	37 1	0*****
125	42 1	Nessesses
130	. 38 1	0*******
135	46 1	()*******
140	38 1	0******
145	43 1	C******
150	33 1	0******
155	42 1	C******
160	44 1	() e e e e e e e e
165	52 1	() * * * * * * * * * * * * * * * * * * *
170	43 1	0*****
175	57 1	3
180	42 1	(*************************************
185 190	31 1 26 1	0****
195	26 1 38 1	0*****
200	52 1	0******
205	37 1	00000000
210	30 1	0.0000000000000000000000000000000000000
215	30 1	0*****
220	35 1	0******
225	25 1	9*****
230	18 0	)****
235	19 0	0****
240	26 1	0****
245	29 1	0*****
250	33 1	0*****
255	25 1	000000000000000000000000000000000000000
260	23 0	() neese e
265	14 0	9***
270	18 0	0***
275 280	15 0 23 0	0+++
285	29 1	0*****
290	45 1	
295	35 1	
300	26 1	Ossess
305	52 - 1	0 ******
310	47 1	0******
315	75 2	000000000000000
320	93 2	Janes
325	105 2	0 *** *** *** *** *** *** *** *** *** *
330	153 3	
335	204 4	
340	198 4	0
345	191 4	2******************************
350	203 4	)*************************************
355	212 4	0***********************

NUMBER OF OBSERVATIONS = 4738

FIG. 30B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING MARCH 25 THROUGH APRIL 27, 1970.



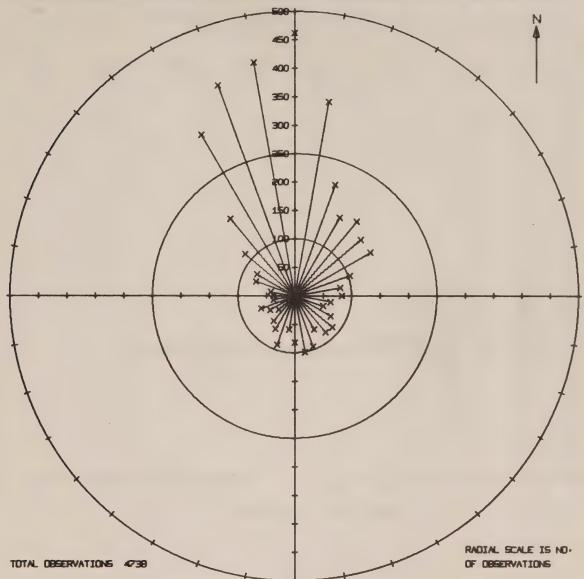


FIG. 30c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING MARCH 25 THROUGH APRIL 27, 1970.

STATION NO. H-26 LAT. 49-11.86 N 1 LONG. 123-19.83 W

HISTOGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 140 METERS D-SERVATION PERIOD, FROM 13.13/25/ 3/70 TO 15. 6/27/ 4/70

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7.65	0	0	0					
7.70	0	С	0					
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d . 25	78	2	0**					
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3,35	16	0	0					
0,40	4	ن	0					
8,45	6	0	0					
8,50	5 6	O O	0					
8,55	a	U	0					

MEAN TEMP # 8.06 DEG. C.

NUMBER OF TEMP. GREATER THAN 8.55 = 0 NUMBER OF OBSERVATIONS = 4738

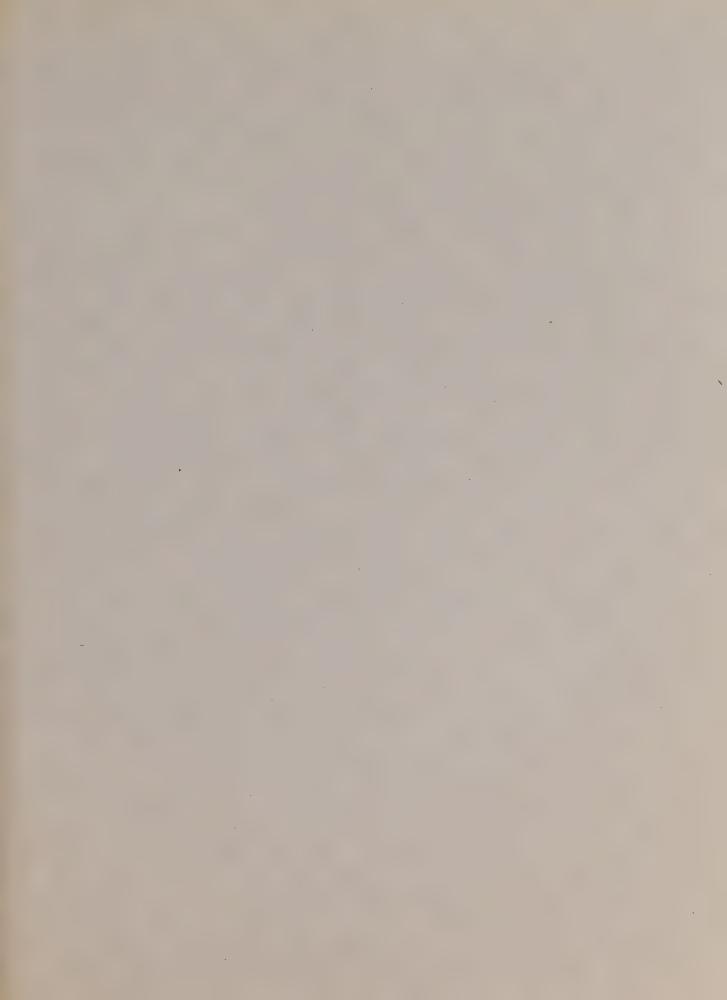
FIG. 30D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDOBTAINED AT 10-MINUTE INTERVALS OVER 33-DAY PERIOD DURING MARCH 25 THROUGH APRIL 27, 1970.



March 25 through April 27, 1970. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 33-day period during as at this location.

Fig. 30e.





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SUMMARY OF OCEANOGRAPHIC RECORDS
OBTAINED FROM MOORED INSTRUMENTS
IN THE STRAIT OF GEORGIA — 1968 - 1970
Current Velocity
from Stations F-11, M-10 and I-31

S. Tabata, J.A. Stickland



ENVIRONMENT CANADA
Water Management Service
Marine Sciences Branch
Pacific Region
1230 Government St.
Victoria, B.C.





# MARINE SCIENCES BRANCH, PACIFIC REGION PACIFIC MARINE SCIENCE REPORT NO. 72-10

SUMMARY OF OCEANOGRAPHIC RECORDS

OBTAINED FROM MOORED INSTRUMENTS

IN THE STRAIT OF GEORGIA -- 1968-1970

Current Velocity

from Stations F-11, M-10 and I-31

by

S. Tabata and J.A. Stickland

Victoria, B.C.
Marine Sciences Branch, Pacific Region
Environment Canada

May, 1972



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#### INTRODUCTION

The waters of the Strait of Georgia have been the subject of many oceanographic studies for more than half a century. The earlier studies of the region consisted mainly of physical, chemical and biological oceanographic descriptions of the waters and some of the main factors affecting the properties of the waters therein. The studies vary, in scope, from a brief initial description of the waters by Fraser and Cameron (1916) and a more detailed work by Hutchinson and Lucas (1931) and to a more complete treatment by Waldichuk (1957), to name a few.

In spite of the number of oceanographic studies made on these waters there was a notable lack of reliable information of the surface and subsurface circulation in the Strait. In order to relieve this deficiency, the Pacific Oceanographic Group embarked on a limited program of current velocity observations in the central portion of the Strait of Georgia. The results of which have already been reported (Giovando and Tabata, 1970) and a series of velocity profile measurements from anchored vessels, the results of which have also been reported (Tabata, Stickland, Wong and Giovando, 1970 (a); 1970(b); 1970(c)).

In recent years the marine technology associated with automated oceanographic observations from moored instruments has advanced to the stage where it is now possible to obtain reliable data from unattended instruments for periods exceeding one month. The present series of observations to be reported here are based on data obtained from such instruments.

The primary objective of the present program of observations is to obtain current velocity records at sufficiently high frequency and of sufficient length so that it would be possible to examine the spectrum of the variability of current velocities in the frequency band between 1 cycle and 10⁻³ cycle per hour (period of few hours to few months approximately), at a representative area of the central Strait. Such data would provide, in addition to basic scientific information, solid background material that would be useful in a variety of applied oceanographic studies such as those associated with pollution and fisheries. As most of the instruments employed recorded temperatures of the water as well as current velocities, they too are reported.

A report describing the observational program, performances of current meters used, mooring technique, computer data-processing method, etc. has already been published in the Technical Report Series of the Fisheries Research Board of Canada (Tabata, Stickland and de Lange Boom, 1971). The summaries of observations obtained from Stations H-06, H-16 and H-26 have already been published in Pacific Marine Science Reports No. 72-7, 72-8 and 72-9 respectively (Tabata and Stickland, 1972).

The present report comprises the summary of current velocity measurements obtained from Stations F-11, M-10 and I-31. It is the fifth of a series of reports associated with the program of oceanographic observations from moored instruments in the Strait of Georgia to be issued.

## The summary contains:

histogram of current speed

2)

histogram of current direction histogram of current direction in polar form {for Station F-11 (50m depth) and Station I-31 (7m depth) only} histogram of temperature {for Station I-31

4) (7m depth) only}

5) progressive vector diagram of current velocities

Local standard time, Pacific Standard Time (P.S.T.), is used throughout (time zone + 8).

#### LOCATION OF STATIONS

The previous reports summarized the observations obtained from a line of 3 stations (H-06, H-16, H-26) placed 10 kilometres (km.) apart between Valdes Island to the west and Point Grey to the east (Fig. 1). Stations F-11 and M-10 were established for the purpose of conducting mooring trials and instrument performance evaluation while Station I-31 was established as the result of an accident. The mooring which was originally placed at Station H-26 was dragged 4 miles to the north of the location of Station I-31 by a tug boat with tow.

The positions and depths of the stations are:

Station F-11 Latitude 49°03.00'N Longitude 123°02.60'W Depth 300m

Station M-10 Latitude 49°17.28'N Longitude 123°44.50'W Depth 293m

Station I-31 Latitude 49°15.83'N Longitude 123°18.45'W Depth 110m

#### COMMENTS

#### Station F-11

## Subsurface-Buoy Mooring

August 14 through October 2, 1968.

Instrument Depth: 50m

Plessey Current Meter (Serial No. 187) Due to malfunctioning of instrument only  $26\frac{1}{2}$ 

days of data obtained. Quality of data some-

what dubious.

Geodyne* Current Meter (Serial No. M-183) 200m

49-day period of observations.

### Station M-10

October 17 through November 28, 1968.

Instrument Depth: 50m

Plessey Current Meter (Serial No. 110) Due to malfunctioning of instrument only several hours of data obtained and therefore not

reported.

200m

Geodyne* Current Meter (Serial No. M-187) 42-day period of observations. Instrument ceased to operate after 42 days of operation

due to deterioration of battery

## Station I-31

## Taut-Rope Mooring

July 24 through July 28, 1969.

Instrument Depth: 7m

Aanderaa Current Meter (Serial No 102)  $3\frac{1}{2}$ -day period of observations available. Observations recorded here result of mooring being dragged here from Station H-26. Depth here 52m less than at Station H-26. Subsurface buoy placed 7m above instrument at 50m depth at Station H-26. Subsurface buoy floating at surface when retrieved at Station I-31. Total length of mooring cable between subsurface buoy and anchor was 119m which is only 9m greater than the depth at Station I-31. Therefore for all practical purposes mooring here considered to be taut-rope mooring.

^{*} It is to be noted that while the Plessey and Aanderaa (Bergen) Current Meters used in the present program were made to sample every 5 and 10 minutes respectively, the Geodyne Current Meter was set to "burst sample" every 15 minutes (that is, every 15 minutes it recorded 15 samples at 5second intervals).

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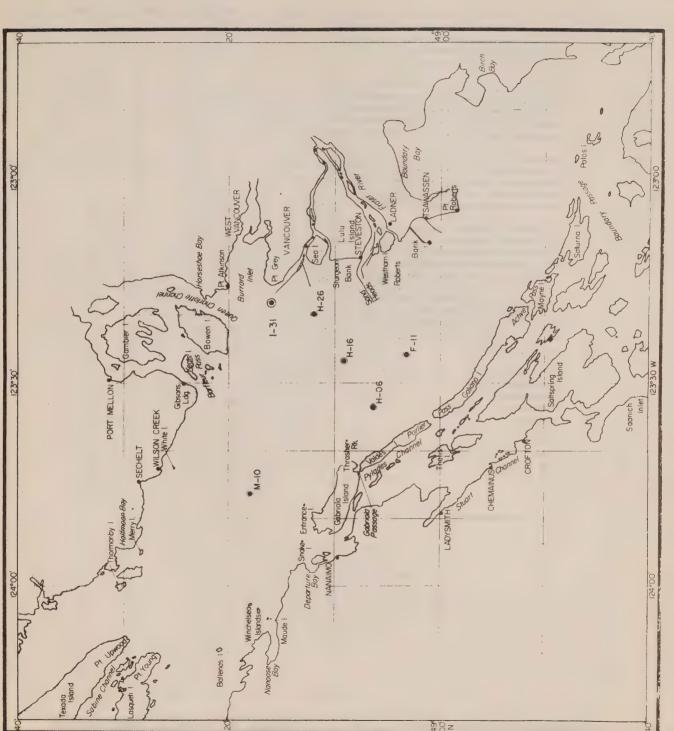
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#### ACKNOWLEDGEMENT

The acquisition of , and the processing of oceanographic data obtained from moored instruments require the assistance and cooperation of many individuals and groups. We acknowledge the assistance rendered by the staff of the Nanaimo Biological Station of the Fisheries Research Board of Canada, of the Pacific Oceanographic Group of the Marine Sciences Branch (now at the Pacific Environment Institute at West Vancouver B.C.), of the men of the research vessels, C.G.S. Parizeau (M.S.B.), C.G.S. Vector (M.S.B.) and C.G.S. A.P. Knight (F.R.B.C.). Individuals associated with the above were duly acknowledged in our first report. Since the publication of the first report in 1971, a number of people have assisted in the computer-processing of data and in the preparation of illustrations. We appreciate the generous assistance given by Mr. J.A.C. Thomson and Mrs. A. Sandnes of the Computing Centre at the Nanaimo Biological Station, Messrs. B. de Lange Boom and I. Daniel who processed the data, Miss T.A. Findlay who prepared the illustrations, and Mr. C. Morley of the Nanaimo Biological Station and Mr. R. Banyard of the Canadian Hydrographic Service of the Marine Sciences Branch who photo-reproduced all the illustrations. We owe our thanks to Miss M. Dyer for organizing and making the preparatory work essential to the publication of this report.



Location of stations in the central Strait of Georgia where observations were unde. The records described in this report were obtained at Stations Ell Milo and I of

Fig. 1.

. (ATIUN NO. F-11 LAT. 49- 3.12 N LONG. 123-25.88 W

MISTOURAM OF SPELD (MM/SEC) FOR CURRENTS AT A DEPTH OF 50 METRES SERVATION PERIOD, FROM 14.50/14/ 8/68 TO 1.15/10/ 9/68

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A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 5-MINUTE INTERVALS OVER 26 1/2-DAY PERIOD DURING AUGUST 14 THROUGH SEPTEMBER 10, 1968. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

TATION NO. F-11 LAT. 49- 3.12 N LONG. 123-25.88 W

HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 50 METRES OF SERVATION PERIOD, FROM 14.50/14/ 8/68 TO 1.15/10/ 9/68

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FIG. 2B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 5-MINUTE INTERVALS OVER 26 1/2-DAY PERIOD DURING AUGUST 14 THROUGH SEPTEMBER 10, 1968.

JMBER OF UBSERVATIONS = 7614

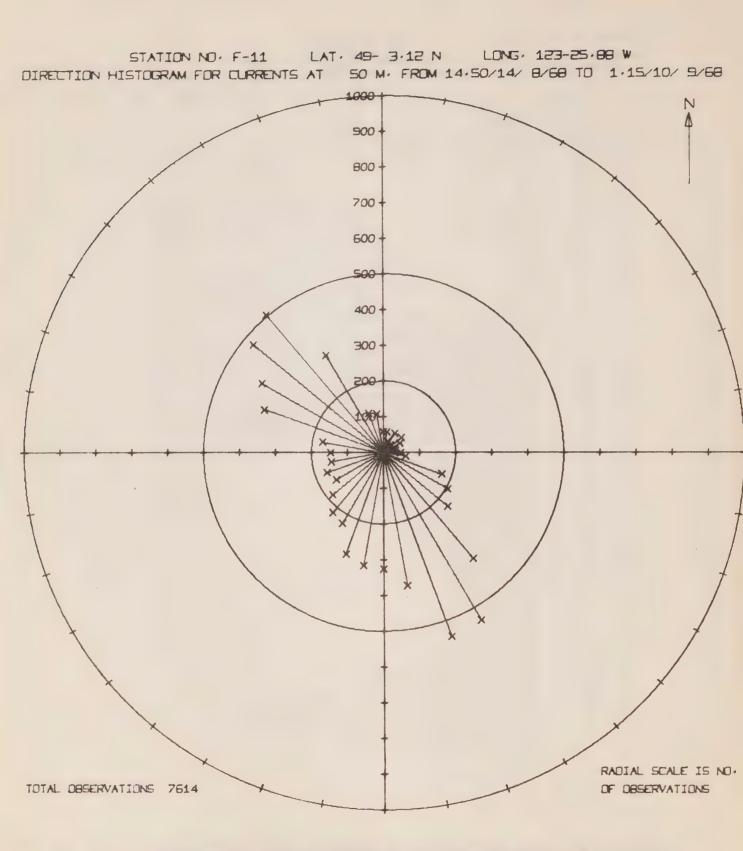


FIG. 2D. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 5-MINUTE INTERVALS OVER 26 1/2-DAY PERIOD DURING AUGUST 14 THROUGH SEPTEMBER 10, 1968.

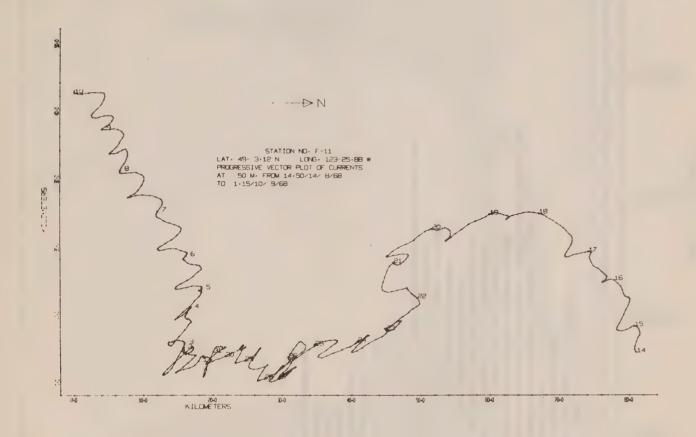


Fig. 2c. A progressive vector diagram constructed from cumulative values of north-south and east-west components of current velocity from records obtained at 5-minute intervals over 26 1/2-day period during August 14 through September 10, 1968. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

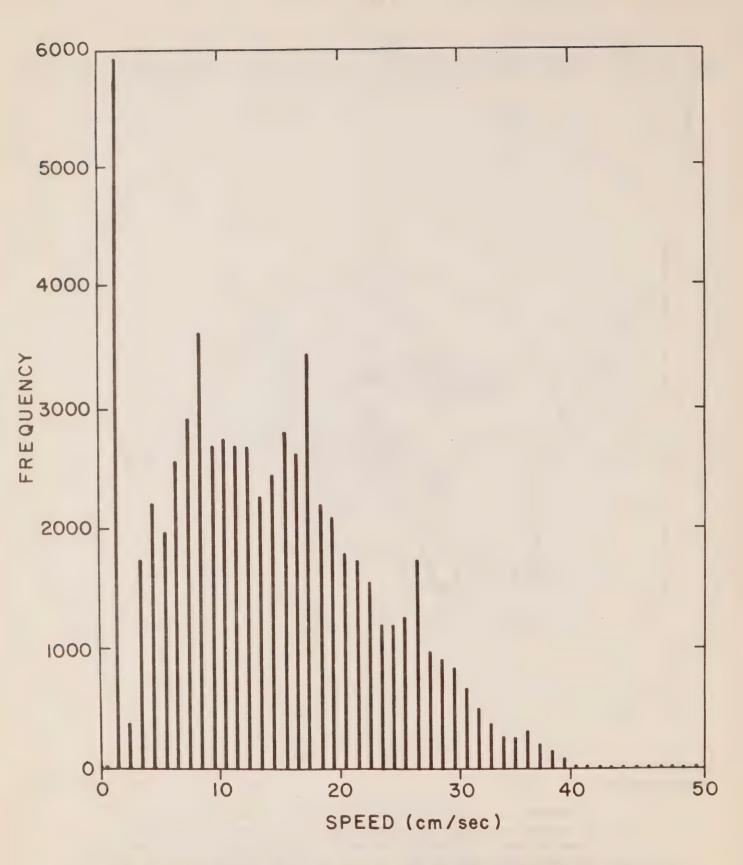
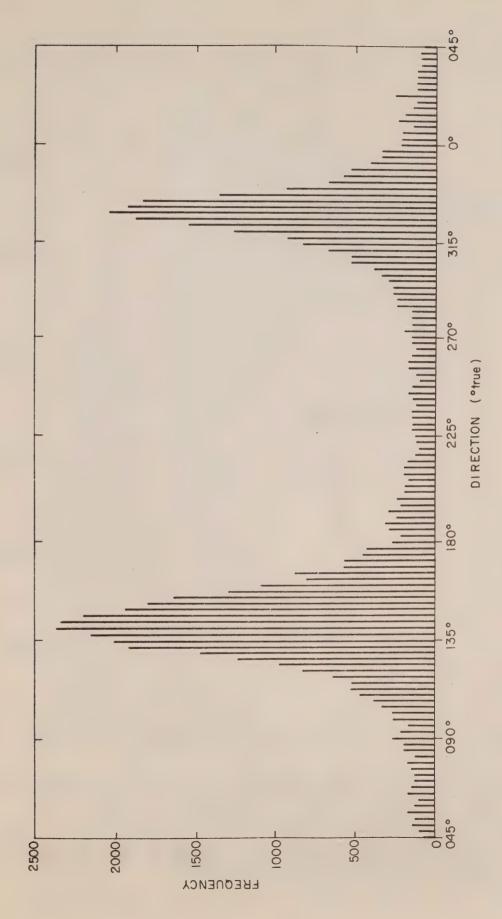


Fig. 3a. Station F-11 at 200m. depth. A histogram of speed (cm/sec), with class interval of 1 cm/sec from records obtained at 15-minute intervals over 49-day period during August 14 through October 2, 1968. Speed less than or equal to 1 cm/sec is considered to be "zero speed".



Station F-11 at 200m depth. A histogram of direction ("true), with class interval of 3", from records obtained at 15-minute intervals over 49-day period during August 14 through October 2, 1968. Fig. 3b.

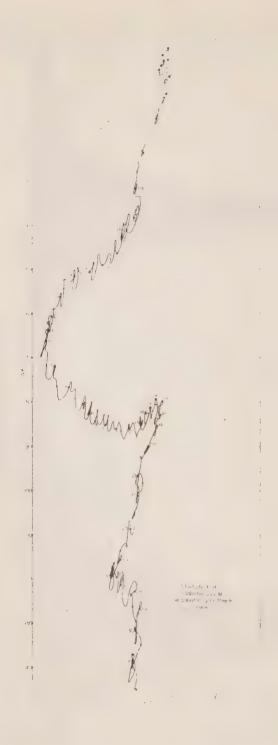


Fig. 3c. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 15-minute intervals over 49-day period during August 14 through October 2, 1968. The spatial scale corresonds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

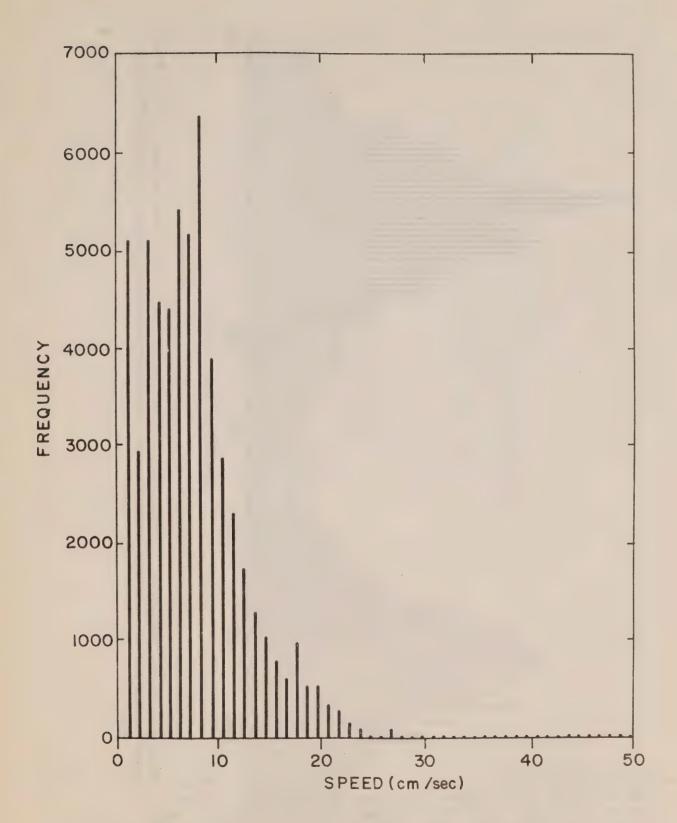
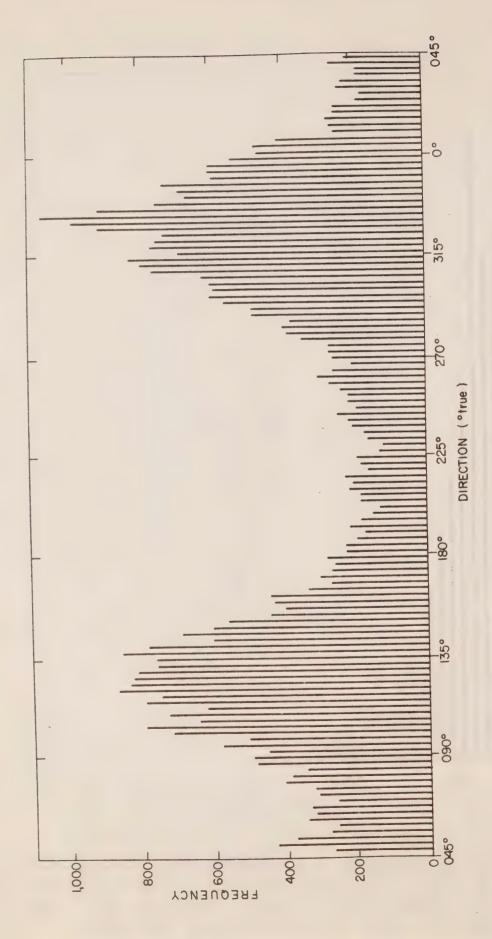


FIG. 4A. STATION M-10 AT 200M DEPTH. A HISTOGRAM OF SPEED (CM/SEC), WITH CLASS INTERVAL OF 1 CM/SEC FROM RECORDS OBTAINED AT 15-MINUTE INTERVALS OVER 42-DAY PERIOD DURING OCTOBER 17 THROUGH NOVEMBER 28, 1968. SPEED LESS THAN OR EQUAL TO 1 CM/SEC IS CONSIDERED TO BE "ZERO SPEED".



Station M-10 at 200m depth. A histogram of direction (°true), with class interval of 3°, from records obtained at 15-minute intervals over 42-day period during October 17 through November 28, 1968. Fig. 4b.

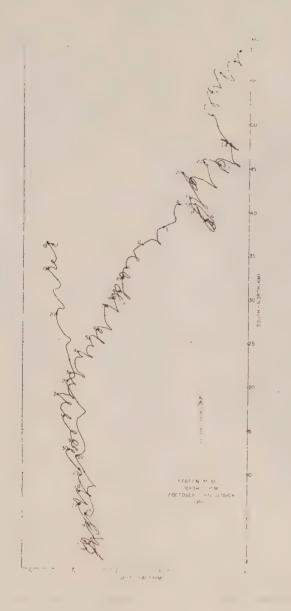


Fig. 4c. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 15-minute intervals over 42-day period during October 17 through November 28, 1968. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.

STATION NO. 1-31 LAT. 49-15.83 N LONG. 123-18.45 W

HISTOGRAM OF SPEED (MM/SEC) FOR CURRENTS AT A DEPTH OF 7 METRES OBSERVATION PERIOD, FROM 21.52/24/ 7/69 TO 5.22/28/ 7/69

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NUMBER OF SPEEDS GREATER THAN 590 = 0 NUMBER OF DESERVATIONS = 477

MEAN SPEED = 280 MM/SEC

F. . .

FIG. 5A. A HISTOGRAM OF SPEED (MM/SEC), WITH CLASS INTERVAL OF 10 MM/SEC, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 3 1/2-DAY PERIOD DURING JULY 24 THROUGH JULY 28, 1969. SPEED LESS THAN OR EQUAL TO 10 MM/SEC IS CONSIDERED TO BE "ZERO SPEED".

100

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STATION NO. 1-31 LAT. 49-15.83 N LONG. 123-18.45 W
HISTOGRAM OF DIRECTION (DEG. TRUE) FOR CURRENTS AT A DEPTH OF 7 METRES UBSCRVATION PERIOD, FROM 21.52/24/ 7/69 TO 5.22/28/ 7/69
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	100	5 1	C++++4	
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	325	. 3 1	0***	
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	340	3 1	0***	
	345	2 0	0**	
	350	5 1	0****	
	355	9 2	0******	

NUMBER OF UBSERVATIONS = 477

FIG. 5B. A HISTOGRAM OF DIRECTION (°TRUE), WITH CLASS INTERVAL OF 5°, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 3 1/2-DAY PERIOD DURING JULY 24 THROUGH JULY 28, 1969.

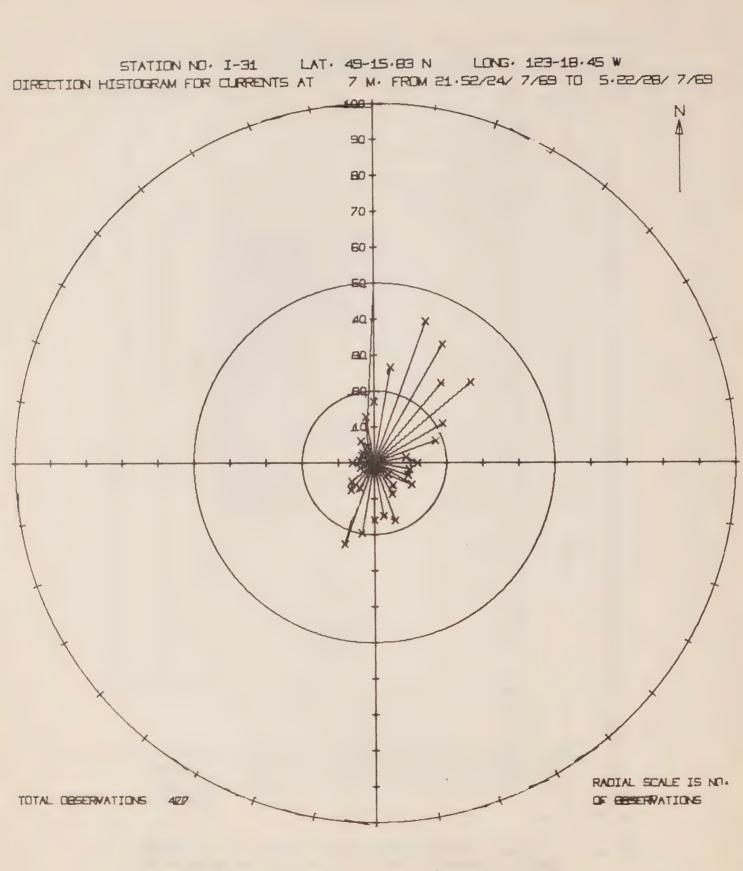


FIG. 5c. A HISTOGRAM OF DIRECTION (°TRUE) IN POLAR FORM, WITH CLASS INTERVAL OF 10°, BASED ON RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 3 1/2-DAY PERIOD DURING JULY 24 THROUGH JULY 28, 1969.

STATION NO. I-31 LAT. 49-15.83 N LONG. 123-18.45 W
HISTUGRAM OF TEMPERATURE (DEG. CENT.) AT A DEPTH OF 7 METERS
OBSERVATION PERIOD, FROM 21.52/24/ 7/69 TO 5.22/28/ 7/69

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10.40	0	0 0										
10.60	1	0 0 0										
13.60	0	0 0										
11.00	0 2	0 0										
11.20	0	0 0										
11.40	0	0 0										
11.60	. 0	0 0										
11.70	1 2	0 000										
11.90	3	1 0***										
12.00	5 4	1 0 ****										
12.20	2	0 0	•									
12.40	3	2 0*****										
12.60	4	1 0****										
12.70	. 6	1 0 ******										
12.70	9	2 0 *** ***										
13.10	5 1	0 0*										
13.30	5	1 0 *****										
13.40	3 2	0 0 ***										
13.60	3	1 0 ***										
13.80	5 3	1 0****					1					
14.00	3	1 0***										
14.10	3	3 3										
14.40	5 2	1 0****										
14.50	3 5	1 0 ***										
14.70	6	2 0										
14.90	4	1 0										
15.00	5 7	1 0	•									
15.20	2 6	1 0										
15.40	4 ô	2 0*****										
15.60	5 7	1 0****										
15.80	8	2 0 ******	••									
15.90 16.00	7	1 0 ***	•									
15.10	6	1 0 ****										
16.30	12	3 0******										
15.50	12	3 0 *****	*****									
16.60	12	3 0 ******	*****									
16.80 16.90	14	3 0	******									
17.00		3 0 ******										
17.20	7	7 0*****										
17.40	20	4 0 *****	********									
17.50	26	8 0 *** ***				*****						
17.70	7	2 0 ******	•									
17.90 13.00		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0										
10.10	1 1	0 0*										
		GREATER TH	AN 18.20 =	0 .	NUMBE	R OF OBSER	VATIONS =	477	MEAN	TEMP = 15.7	9 DEG. C.	

FIG. 5D. A HISTOGRAM OF TEMPERATURE (°C), WITH CLASS INTERVAL OF 0.05°C, FROM RECORDS OBTAINED AT 10-MINUTE INTERVALS OVER 3 1/2-DAY PERIOD DURING JULY 24 THROUGH JULY 28, 1969.

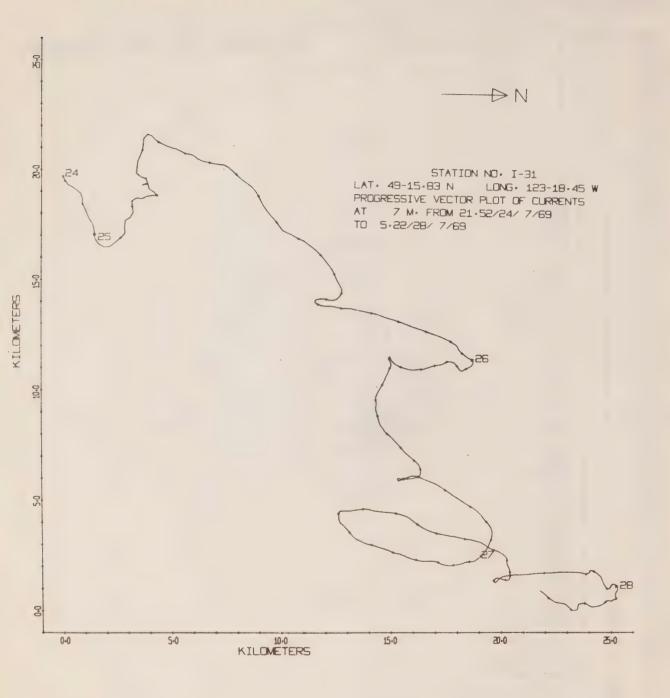


Fig. 5e. A progressive vector diagram constructed from successive cumulative values of north-south and east-west components of current velocity from records obtained at 10-minute intervals over 3 1/2-day period during July 24 through July 28, 1969. The spatial scale corresponds to the displacement of the water that would occur if the motion in the entire neighboring area of the location of the instrument was the same as at this location.



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# PRELIMINARY REPORT ON THE OIL SPILL FROM THE GROUNDED FREIGHTER "VANLENE" MARCH, 1972



ENVIRONMENT CANADA Water Management Service Marine Sciences Directorate Pacific Region 1230 Government St.

Victoria, B.C.



## MARINE SCIENCES DIRECTORATE, PACIFIC REGION

## PACIFIC MARINE SCIENCE REPORT NO. 72-11

PRELIMINARY REPORT ON THE OIL SPILL
FROM THE GROUNDED FREIGHTER "VANLENE"

March, 1972

by

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Environmement Canada

June, 1972



#### Introduction

On the evening of March 14, 1972 the freighter "Vanlene", bound for Vancouver from Japan, ran aground at the entrance to Barkley Sound on the west coast of Vancouver Island (Figure 1). (The "Vanlene" was sailing under a "flag of convenience", Panamanian registry.) At the time of collision the vessel was approximately 30 miles off course. Fortunately, the entire 38-man crew was rescued by the timely efforts of the Canadian tug "Neva Straits", which then transferred the survivors to CNAV "Laymore" - which had also been called to the scene - for landing at Alberni.

In the course of the grounding, several of the "Vanlene's" fuel and lubricating oil tanks were ruptured, the worst breaks occurring in the vicinity of the engine room; the oil immediately commenced to leak from the vessel (Figure 2). It may be noted that, at the time of grounding, the "Vanlene" had on board approximately a total of 100,000 imperial gallons of bunker B, diesel fuel and lubricating oil.

Several Canadian government ships had answered the distress message of the "Vanlene"; therefore on the first day of the spill CCGS "Camsell" and "Ready", along with CNAV "Laymore" and "Comox Post" of the Fisheries Service, were on the scene. "Sudbury II", the ocean-going tug of Seaspan International Ltd., also appeared in the area on tender to M.O.T. as a salvage vessel. Another sea-going tug, the CNAV "St. Anthony", was later brought into operation to transport pumps, "booms", "slicklickers" and supplies to the scene. The CSS "Vector" arrived on March 18 carrying Fisheries Research Board personnel to assess possible damage to shell fish and to the herring spawning grounds and also to survey the extent of oil contamination. The "Comox Post" and several fishing vessels were used by biology students from Simon Fraser University to conduct beach surveillance for oil.

## Objectives of the Operation Described in this Report

After the rescue of the "Vanlene" crew, an operation primarily concerned with the effect of the oil spillage from the vessel came into being. Its objectives were:

- 1. The assessment of the oil-containing capacity of the vessel.
- 2. The arrangement for acquisition of material and equipment (booms, slicklickers, etc.) to combat spillage.

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- 3. The determination of the extent of the spilled oil by aerial and surface reconnaissance.
- 4. The corraling of spilled oil by the use of two types of booms.
- 5. The "treatment" of oil with peat moss.
- 6. Experiments to determine the usefulness of booms and slicklickers in removing oil from open water.
- 7. The setting up of methods to efficiently assess the extent of the oil spill and to designate several "experimental" areas for observation to determine long-term effects.
- 8. Removal of oil remaining on the vessel.

Most of the above items will be thoroughly covered in separate reports to be issued later. The present report is therefore basically preliminary in nature.

## General Weather Conditions

The air (40°-50°F) and water (40°-43°F) temperatures experienced during the period March 14-23 were not unseasonal. Precipitation was typical for this time and area; during the period of the operation there occurred three days of heavy rain (approximately 3 in/day) and several days of clear "westerly" weather, accompanied by offshore fog banks. The offshore winds were variable, several days of southeast winds being succeeded by westerlies interspersed with the odd day of northeast winds. This variability in the wind resulted in concomitant variability in sea state at the scene of the grounding.

## Geographic Location

The grounding of the "Vanlene" occurred on rocks off Austin Island at the southwestern end of the Broken Group Islands in Barkley Sound (Figure 1).

The sound is a large, roughly rectangular body of water with three main channels: Trevor, Imperial Eagle and Loudoun, which are separated from each other by groups of islands. The coastline is indented by several narrow inlets and small bays. On the northwestern portion the foreshore consists basically of a gently-sloped rock and gravel beach, whereas elsewhere the foreshore tends to be rather steep and rocky.

## Oceanographic and Meteorological Features

During the winter months runoff in the area tends to be extensive, four main rivers — Effingham, Toquart, Maggie and Sarita — being the main contributors within the sound. Alberni Inlet is a source of low-salinity runoff water from the more-inland drainage area.

During March, 1972 runoff was above average along the coast (Water Survey of Canada, private communication). Several estuarine circulation patterns can arise from varying runoff and changing meteorological conditions. These patterns can perhaps be illustrated by means of the surfacesalinity distributions. Herlinveaux (1966) showed examples of these distributions from surface data collected in 1954, and deduced that these were basically two forms, as shown in Figures 3A and 3B. The associated circulations, on the basis of the few actual measurements conducted in the area at the time, are indicated by the arrows. Although the runoff was lower for the period dealt with in Figure 3 than in the working period in March, 1972 one might expect that the patterns would not change significantly in form but only perhaps in intensity.

The orographic features associated with the borders of the sound deflect the winds from a "normal" geostrophic pattern. As a result, winds tend to possess an onshore component, regardless of the wind direction off the west coast; the predominant components are westerly and southeasterly. The presence of diurnal winds, common when clear skies prevail, results in changes in wind direction in the morning and late evening. Periods of calm are generally associated with the times of change. At any given time, for moderate or light winds, marked variation can exist within the sound; this can, for example, be detected from the air by the variability in sea state. This characteristic of the wind within the area is believed to have a marked effect on surface-water movement. Examples of such movements are shown in Figures 4 and 5.

These figures (aerial composite photos of the area, courtesy of the Air Division of the Surveys and Mapping Branch, B. C. Department of Lands, Forests and Water Resources) show wind-wave movement from two dominant wind directions - westerly (Figure 4) and southeasterly (Figure 5). Also shown in these figures are "streaks" or "bands" of darker water (slicks). These are assumed to be associated with "oil" produced by organic material within the intertidal zones of the reefs and islets.

Throughout the entire period of the operation (March 14-23) a westerly swell predominated in the sound. The sea state varied with the wind intensity and direction.

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The location of the "Vanlene" grounding is also indicated with a large "X" on Figure 4. This location is exposed to the open ocean environment from the southeast to the northwest, but tends to be in a "lee" position with respect to west and north.

## Personnel

The co-ordinator of the project to study the consequences of oil spillage, Mr. L. E. Slaght of M.O.T., was assisted by personnel from various departments.

Mr. R. Baird, of the Steamship Inspection Branch, was to report on the state of the "Vanlene" and to work in close cooperation with the Salvage Master of Seaspan. LCDR. S.J. Fairbairn, Canadian Forces, had the responsibility of acquiring vessels and equipment and supplies such as sea trucks, barges, "booms", peat moss, etc. all of which were on route to the area within a day. Mr. J. Bennett of Bennett Pollution Control Ltd. supervised the assembly and deployment of the "Bennett boom", and advised and assisted in the use of the large pump he had brought to the scene for emptying the vessel's oil tanks.

A team of biologists located at the Bamfield Marine Station was carrying out field work in the Bamfield area. Dr. W. Austin, head of the team, volunteered to move into the oil-affected area to determine the extent of contamination. Dr. Austin, assisted by Dr. L. Dreuhl, organized 30 to 40 University biology students to survey a number of sampling areas, some contaminated by oil, some not, for periodic examination in an on-going study to determine extent of permanent and temporary damage. This team continued to sample the area quite extensively up to March 19, and have since returned to the area several times.

Another group arrived on March 18 on the CSS "Vector". This group consisted of Dr. D. Quayle and Mr. D. Outram of the Pacific Biological Station, Nanaimo. They surveyed the vicinity of the islands and the herring spawning areas from Mayne and Toquart Bays to Amphitrite Point. They found little evidence of oil at this time; a few sea gulls were noticed to be spotted with oil but they could have flown in from areas nearer the wreck. It may be noted that Quayle and Outram returned to the area about three weeks later, on the neap-tide period; their findings on these two and on further investigations to be made will be published separately. Mr. A. Ages, who also accompanied this group, was interested in determining the extent to which the oil had spread. His conclusions have already been published (Ages, 1972). He also tried sampling the water column in several areas to determine if the oil was emulsified and had spread throughout the water column.

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Capt. A. McRae, of the Fleet diving unit, Canadian Forces, had an eight-man diving team on board the CNAV "Laymore" at the time of the "Vanlene" sinking. The diving team was deployed to determine the extent of damage and to recover the ship's engineering logs and engineering diagrams; they succeeded in both tasks.

#### Aerial Surveys

Observations from a helicopter were carried out by Mr. Slaght whenever weather conditions permitted. The flights showed that the oil had travelled into Loudoun Channel (Figure 1) on the first day following spillage, but visibility was insufficient to carry out complete assessment of the area on a daily basis. However, those oil slicks that were noted were moving northwestward in the same general direction as the "natural" slicks shown in Figure 5.

These aerial surveys indicated that the oil most distant from the wreck was dispersing readily; attention was therefore focussed both on the oil in the immediate vicinity of the wreck and on that remaining aboard.

#### Observations

A "harbour boom" was first deployed through the islets north of the wreck, to the northerly side of Austin Island. This type of boom was constructed of large fishing floats, about 6" to 8" in diameter, strung on a nylon towline, the whole enclosed in a canvas-like material.

The original plan was to direct and localize the oil behind Austin Island so that it could be collected by the "slicklickers" when they became available. Unfortunately, before an attempt could be made to "gather up" the oil, the wind increased and the sea became somewhat choppy; the oil commenced "jumping" the harbour boom and moving away from the designated "corral".

The work boat from the CCGS "Camsell" was directed to proceed to the beach areas characterized by the heaviest concentration of oil (such as Cooper Island - Figure 6A) and also to any large slicks they could locate. The crew spread dry peat moss over the affected areas. The continuous torrential rains and the heavy surf in the vicinity of the beach made this spreading a thoroughly miserable job; at the beaches it became impossible to continue on the high tide because of large numbers of logs washed onto the foreshore. However,

Page 6.

approximately 30 bales of moss (each of approximately 10 cu. ft. in volume) were spread during the first day to hold the oil and prevent it from endangering bird life in that area.

In addition, the "Comox Post" was used both in transporting students to survey various locations (Page 4) and in spreading peat moss on very oily patches found around the islands.

On some contaminated beach areas the limbs of shoreline trees overhung the water at high tide. In one area the limbs of shoreline trees were covered in oil by the incoming tide.

#### RESULTS:

#### Removal of Oil from Fuel Tanks

On the morning of March 20, it appeared that at least one more tank containing bunker B had ruptured, even though it was believed that no significant quantity of such oil remained on the ship. The resulting slick, driven by a northeast wind, moved onto and between the seaward islands of Barkley Sound. Up to this time these islands had received very little oil. It was therefore decided that an attempt should be made to pump both the forward tank (believed to contain an appreciable amount of oil) and the engine room with the large "Bennett" pump. By evening, 2500 gallons had been removed. The next day, Seaspan personnel attempted to pump again, using a pump smaller than the Bennett type; some success was achieved.

## Effectiveness of "Harbour" Booms

Harbour booms were the first used in the wreck area, and as long as there was little current and a calm sea oil could be corralled. However, most of the time foot-high seas moved the oil over the top of the boom; also if the water movement was perpendicular to the boom, some oil moved under the boom.

#### "Bennett" Boom

The Bennett boom was assembled alongside the wharf in Bamfield (Figure 7) in approximately 26 hours. The 1500 ft. boom basically consists of synthetic materials which were weighted down by a lead-like apron buoyed up by

"styrofoam logs". The apron hung 6 ft. down in the water while it extended up, like a sail, 2 ft. above the buoying system. The boom can be towed at a speed of at least 8 knots. After assembly it was towed out from Bamfield, but could not be put into operation immediately because of weather conditions. Finally, the boom was secured between the rocks to the north of the "Vanlene", and a tug towed the other end alongside the vessel (Figure 8). Some oil was actually corralled by the boom (Figure 9) but it could not be removed. On several occasions, a weather prediction for the following day was obtained by radio. Plans were therefore made to use the Bennett boom to take advantage of the "corralling effect" of the expected wind drift. Unfortunately, the weather system either moved faster than expected or did not materialize at all; thus by the time the boom was in place, the prevailing surface current was in an unprofitable direction (Figure 10).

On March 21 the boom was set out to the eastward of the wreck; it was planned to use slicklickers to pick up any intercepted oil. However, only a very small amount of oil appeared (Figure 11); in addition, the slicklicker was, unfortunately, non-operational.

The Bennett boom, when used as a surface-movement deflector, worked well and oil moving in the area could be directed as already noted (Figure 9). However, when the boom was used as a collector on the open coast (surface flow almost directly onto the boom) it did not stop the oil movement in the deeper water, but as it approached the shallows oil was very noticeably being collected (Figure 12). The oil did not "jump" the boom as it had in the harbour boom situation. On the basis of the present experience it is believed that, unless a very deep boom (which would be unwieldy) could be built, oil could never be effectively corralled in the presence of an appreciable swell and/or surface current. However, used as a deflector it worked rather well when the current flow direction was at an angle to the boom. It was planned, on one trial, to tow the Bennett boom in the shape of a "V" and operate a slicklicker at the apex of the "V", but sea conditions prevented such a trial.

## Slicklickers

Two slicklickers appeared on the scene; one, the older type model and the other, new from the east coast. The older model was tried several times; however, the swell present even behind the island did not allow any oil to be "licked" up as the apparatus kept diving under the oil and picking up only water. On the first day of use, the newer machine was plagued with leakage problems due to loose plates in the flotation pontoons. This condition resulted in both motors being flooded with salt water. From this time on, the machine had to be pushed by a power barge.

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#### CONCLUSIONS:

It was fortunate that the "Vanlene" oil spill was a minor one. It was quickly realized that, even for a spill of this size, the personnel involved were very inadequately equipped and generally ineffective in coping with the situation. Both types of booms ("Harbour" and "Bennett") used in an attempt to corral the oil, were found to be effective only as "deflectors" of the spill in open coastal areas. If the current was directly "onto" the booms, oil would move under them. The slicklickers were found to be of little use in open coastal areas.

Although the weather conditions hindered the oil retrieval operations, the heavy precipitation and run-off proved to be a blessing in disguise, since the fresh water runoff formed a stream around the shore of Barkley Sound which tended to keep the oil away from the shore. To some degree, this happened around the Broken Group Islands. Only when the weather had cleared and runoff had diminished did any significant quantity of oil show up on the foreshores. The high runoff in Barkley Sound also resulted in a strong estuarine flow along the northern shore which carried seaward, at a rate of up to 1.5 to 2.0 knots, any oil that entered it. This also indicated, however, that oil from the "Vanlene" could have been carried as far as Estevan Point (Figure 1) in a two-day period.

#### DISCUSSION AND RECOMMENDATIONS:

To deal with future crises of this nature, it is recommended that an "emergency measures group" be formed of representatives from M.O.T., C.F.B. and D.O.E. These representatives are to be contacted as soon as an oil spill occurs. They will then, as a group, proceed to the emergency area to assess the extent of the spill and thus to determine the size of the "clearing" operation required. The group itself could consist of a single person from each of the three departments. Each of these in turn would be backed up by one or more persons, who, once the degree of emergency was determined, would designate personnel in the appropriate department to carry out certain duties in the overall plan.

The most difficult task of such a procedure would be determination of the degree of emergency. Because of the many problems of handling oil on the open coast, a major effort should be expended, if feasible, to remove the ship from the grounding site and into a more "protected" or secluded location where the oil still aboard could be

Page 9.

removed more conveniently. However, if the general area involved is especially vulnerable to the effects of oil contamination (a recreational, fish-spawning or wildlife area) then the location to which the ship is to be moved must be extremely carefully selected to minimize the possibility of permanent ecological damage.

If the vessel cannot be moved, the problem becomes much more complicated. The primary objective would then be the removal of the oil from the vessel, the secondary one to direct the escaping oil itself to a confined area where it could be more easily removed. The tertiary target would be the clean-up of the shore.

In the case of tanker collisions in open coastal areas, the problem again changes. If the tanker can be towed into port the spilled oil at the collision site could be tracked by monitoring the surface drift with a transponder buoy; even better perhaps would be the use of current followers lying "in" the surface itself, eg. plywood sheets. When the general drift has been determined, equipment and ships could be deployed to an area where the oil could be contained and handled. A future possibility is tracking of oil spills by infra-red scanner in conjunction with film or video equipment.

The Department of Environment (D.O.E.) should have on file - and <u>easily accessible</u> - all work that has been carried out on water movements, locations of spawning grounds and nesting areas, etc. on the B. C. Coast. The information should include all published and unpublished data, together with a list of personnel who have been involved in such work and their fields of interest.

## Suggested Equipment Requirements

- 1. Enough "walkie-talkie" equipment and/or portable radios to set up a communications network between all "local" working units and operational headquarters, with a common frequency assigned at least for the duration of the emergency.
- 2. A portable weather station and wave recorder for "local" use; in addition the data could be transmitted to the Atmospheric Environment Service's nearest major office for use in prediction of weather for the area.
- 3. Slicklickers that are not seastate limited eg. centrifuge ("cream-separator") type.
- 4. Peat-moss dispensers similar to "straw guns"; goggles for the operators of such equipment.

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- 5. Rubber bag "dracons" both for the collection of oil and water mixtures from slicklickers and for the separation of the two constituents.
- 6. A pumping system capable of preheating bunker B and C oils, to facilitate emptying of vessel fuel tanks.
- 7. A system for "through-the-hull" sounding to determine fuel volumes remaining in directly inaccessible tanks.
- 8. A portable file (or a booklet) of aerial photographs, indicating sea and swell conditions to be expected with "major" wind systems, and surface drift, along the entire B. C. Coast.
- 9. Radio D.F. equipment at suitable locations along the B. C. Coast to aid in accurately determining positions of distressed vessels.

## Acknowledgement

The author wishes to acknowledge the assistance of Dr. L. F. Giovando in the preparation of this report.

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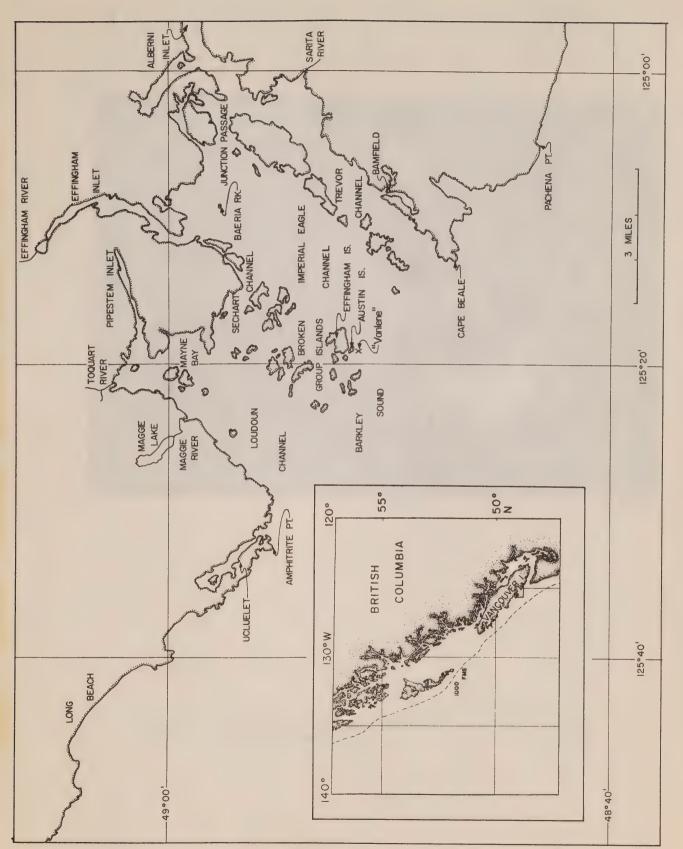
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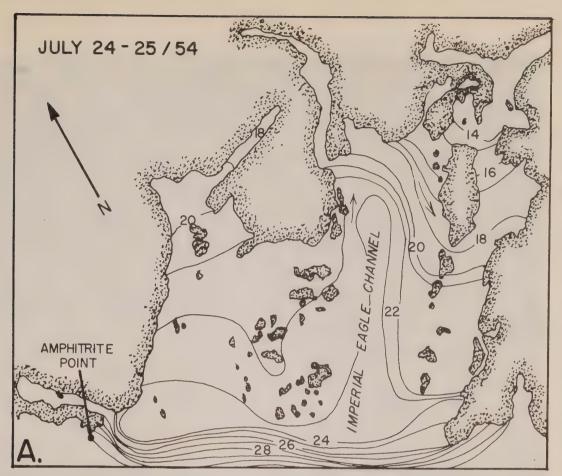
Map of the area showing the site of the "Vanlene" grounding in Barkley Sound. Figure 1





Figure 2 The "Vanlene" aground off Austin Island, Barkley Sound.





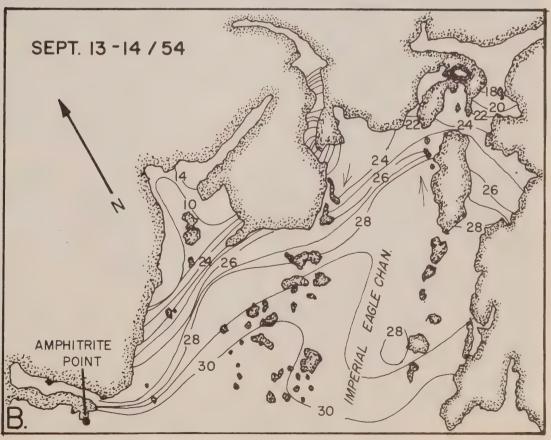


Figure 3 Representative surface-salinity distributions that were experienced in Barkley Sound during July and September, 1954.





Aerial composite photograph of the area (Air Division of the Surveys and Mapping Branch, B. C. Department of Lands, Forest and Water Resources) showing surface slick movement and wave movement during westerly winds.

Figure 4





Aerial composite photograph of the area (Air Division of the Surveys and Mapping Branch, B. C. Department of Lands, Forest and Water Resources) showing surface slick movement and wave movement during southeasterly winds. Figure 5



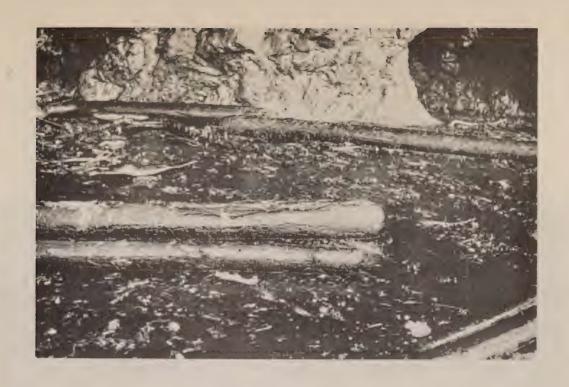




Figure 6A One portion of the oil-contaminated beach on Cooper Island.

Figure 6B An accumulation of oil in one of the bays in the area (Effingham Island).





Figure 7 Bamfield wharfs where the "Bennett" boom was assembled.





Figure 8 "Bennett" boom being towed by tug to an islet where boom was secured.



Figure 9 The "Bennett" boom secured to the islet and oil moving down boom in high enough concentration to be collected.





Figure 10 Oil slick reversing its direction of flow; boom in foreground at bottom of picture, CCGS "Camsell" at top.



Figure 11 Boom in position (little oil in the immediate grounding area).



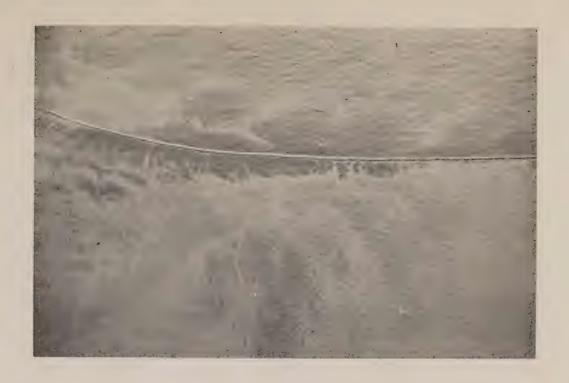


Figure 12 "Bennett" boom in direct path of surface movement - oil on both sides of boom.



Figure 13 "Bennett" boom with the surface flow directly onto the boom from the right to mid-photograph and a flow at an angle to the boom in the shallower water to the left in the picture.





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